



MANAGEMENT

A CONTINUING LITERATURE SURVEY

— With Indexes —

MAY 1971

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

This issue of MANAGEMENT (NASA SP-7500) incorporates a section devoted to material selected from the files of the Defense Documentation Center (DDC) of the Department of Defense.

Grateful acknowledgement is made to Dr. Robert B. Stegmaier, Jr., Administrator of the DDC, and his staff for their cooperative contribution, which clearly enhances the utility of this bibliography as a management information tool.

MANAGEMENT

A CONTINUING LITERATURE SURVEY

– With Indexes –

A selection of annotated references to unclassified reports and journal articles entering the NASA and DoD information systems in 1970.



Scientific and Technical Information Office
OFFICE OF INDUSTRY AFFAIRS
AND TECHNOLOGY UTILIZATION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MAY 1971
Washington, D. C.

This document is available from the National Technical Information Service (NTIS), Springfield, Virginia, 22151, for \$3.00.

INTRODUCTION

Coverage

Management is a compilation of references to selected unclassified reports and journal articles on the subject of management. This publication assembles groups of citations previously announced in 1970 in separate journals—*Scientific and Technical Aerospace Reports (STAR)*, *International Aerospace Abstracts (IAA)*, and *U. S. Government Research and Development Reports (USGRDR)*—together with other reports included in the NASA system but not previously announced. The present issue contains 509 references.

Exclusions

Items concerning management in the fields of reliability and quality assurance have, for the most part, been excluded. Such items appeared in the 1970 issues of *Reliability Abstracts and Technical Reviews (RATR)*, a journal prepared by the NASA Scientific and Technical Information Facility from input provided under a NASA contract by the Research Triangle Institute, Durham, North Carolina. Most items involving a purely mathematical approach to management subjects have also been excluded.

Organization of this Literature Survey

Separate sections have been included for *STAR* Entries (including other reports in the NASA system), *IAA* Entries, and Defense Documentation Center (DDC) Entries. For greater convenience, each section is subdivided into nine subject categories as indicated on page vii. The categories bear no relationship to those in *STAR*, *IAA* or *USGRDR*, but have been specifically chosen for this publication. All items of Department of Defense origin are grouped together in the DDC Entries section, with cross references from the other sections where the identical items may also be cited.

Many of the abstracts included in *Management* have been reproduced from those appearing in *STAR*, *IAA*, and *USGRDR*. This procedure, adopted in the interest of economy, has introduced some variation in size, style, and intensity of type.

Under each subject category, the citations are arranged in retrogressive accession number order, the most recent acquisitions coming first. Three indexes are provided: subject, personal author, and corporate source.

Earlier Issues

Four earlier issues of this continuing survey have been published. The first issue (NASA SP-7500) covered documents generated or sponsored by NASA from 1962 through 1967; NASA SP-7500 (02) covered documents generated or sponsored by agencies other than NASA in the same time period; NASA SP-7500 (03) covered NASA and non-NASA documents acquired in 1968; and NASA SP-7500 (04) not only covered NASA and non-NASA documents acquired in 1969 but also, like the present supplement, contained a separate section on documents provided by the Defense Documentation Center.

Availability of the Earlier Issues

The earlier issues are available, as this supplement is, from the National Technical Information Service, Springfield, Virginia 22151. Prices are as follows:

NASA SP-7500	\$6
NASA SP-7500 (02)	\$6
NASA SP-7500 (03)	\$3
NASA SP-7500 (04)	\$3
NASA SP-7500 (05)	\$3

AVAILABILITY OF CITED PUBLICATIONS

STAR Entries (N70-10000 Series)

A source from which a publication abstracted in this section is available to the public is ordinarily given on the last line of the citation, e.g., Avail: NTIS. The following are the most commonly indicated sources (full addresses of these organizations are listed at the end of this introduction):

Avail: NTIS. Sold by the National Technical Information Service at a standard price of \$3.00 for hard copy (printed, facsimile, or reproduced from microcopy) of 300 pages or less. Documents in the 301 to 600 page range are sold for \$6.00 in hard copy, and those in the 601 to 900 page range are sold at \$9.00. Documents exceeding 900 pages are priced by NTIS on an individual basis. These prices apply retroactively to all documents in the NTIS collection, but in addition, documents of 300 pages or less that are over two years old (from date of announcement in *U.S. Government Research and Development Reports*, or *STAR* for those items announced only in *STAR*) will have a surcharge of \$3.00 added for a total price of \$6.00.

Microfiche⁽¹⁾ is available from NTIS at a standard price of 95 cents (regardless of age) for those documents identified by the # sign following the accession number (e.g., N70-15495).

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. (An order received by NTIS for one of these documents will be filled at the SOD price if hard copy is requested. NTIS will also fill microfiche requests, at the standard 95 cent price, for those documents identified by a # symbol. SOD does not sell microfiche.)

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts*, and are sold by University Microfilms, Inc. as xerographic copy (HC), microfilm, or microfiche at the prices shown. Microfiche are available only for those dissertations published since January 1, 1970. All requests should cite the author and the Order Number as they appear in the citation.

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

IAA Entries

All documents cited in the *IAA* section are available from:

Technical Information Service
American Institute of Aeronautics and Astronautics, Inc. (AIAA)
750 Third Avenue
New York, N.Y. 10017.

Paper copies are available at \$5 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents.

Microfiche of documents announced in the *IAA* section are available at the rate of \$1.00 per microfiche on demand. Documents available in this manner are identified by the # sign following the accession number in the citation.

Minimum air mail postage to foreign countries is \$1.

A number of publications, because of their special characteristics, can not be reproduced.

Please refer to the *IAA* accession number shown at the beginning of the citation when requesting publications from AIAA.

(1) A microfiche is a transparent sheet of film, 105 x 148 mm in size, containing up to 72 pages of information reduced to micro images (not to exceed 20:1 reduction).

DDC Entries

Documents cited in the DDC section are available from NTIS, unless another source is specified in the citation. Please refer to the accession number given in the last line of the entry when requesting publications in the DDC section from NTIS.

Some documents received by NTIS from contributing agencies are of poor reproduction quality. However in an effort to make as much information as possible available to the public, NTIS will sell these documents. Requests from DDC users for paper copy documents are subject to a service charge. Requests must be accompanied by payment and be sent to NTIS. Although DDC users need not register with NTIS, each request must include DDC code, DoD contract number and routing information. Microfiche of DDC reports will continue to be available to DDC users at no cost from:

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

General Availability

All publications abstracted in this literature survey are available to the public through the sources as indicated in the STAR Entries, IAA Entries, or DDC Entries sections. It suggested that the literature survey user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
750 Third Ave.
New York, N.Y. 10017

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

National Technical Information Service
Springfield, Virginia 22151

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms, Inc.
313 North First Street
Ann Arbor, Michigan 48106

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M2 CONTRACT MANAGEMENT

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Includes program evaluation and review techniques (PERT); planning, programming and budgeting systems (PPBS); prediction analysis techniques (PAT); program trend line analysis; cost effectiveness; simulation; computers; operations research.

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Includes personnel problems; motivation; environmental problems; personnel development and training; recruitment; psychological studies; communication.

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Includes management concepts; policy studies; organizational studies and problems; social relationships and problems.

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Includes impact of federal expenditures and programs; government/industry relations; federal financing; federal budgeting; federal resources and urban needs.

21 41 65

M9 GENERAL

Includes conference proceedings; reviews; patent information; speeches; bibliographies.

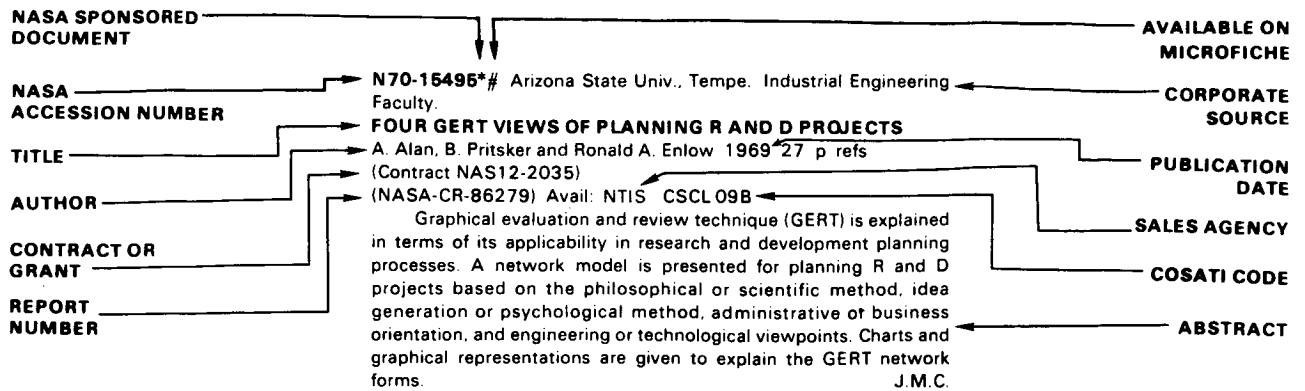
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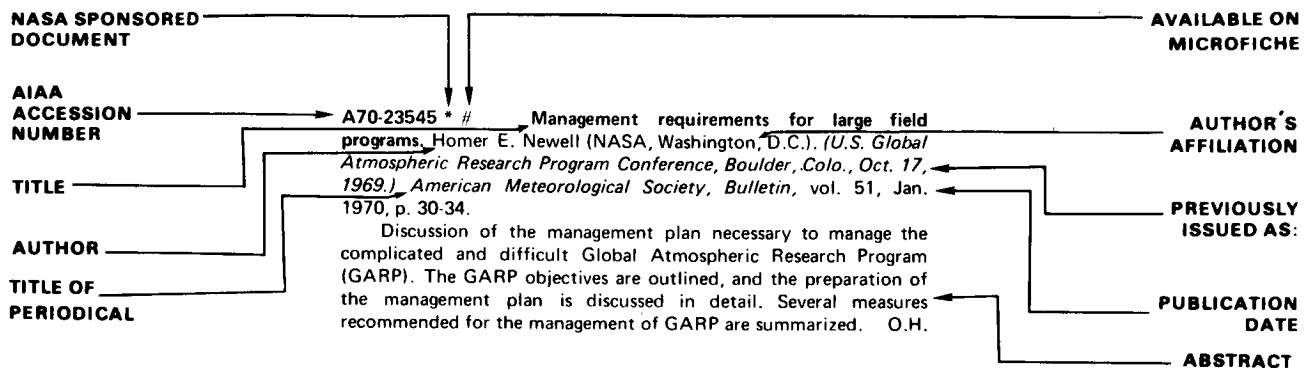
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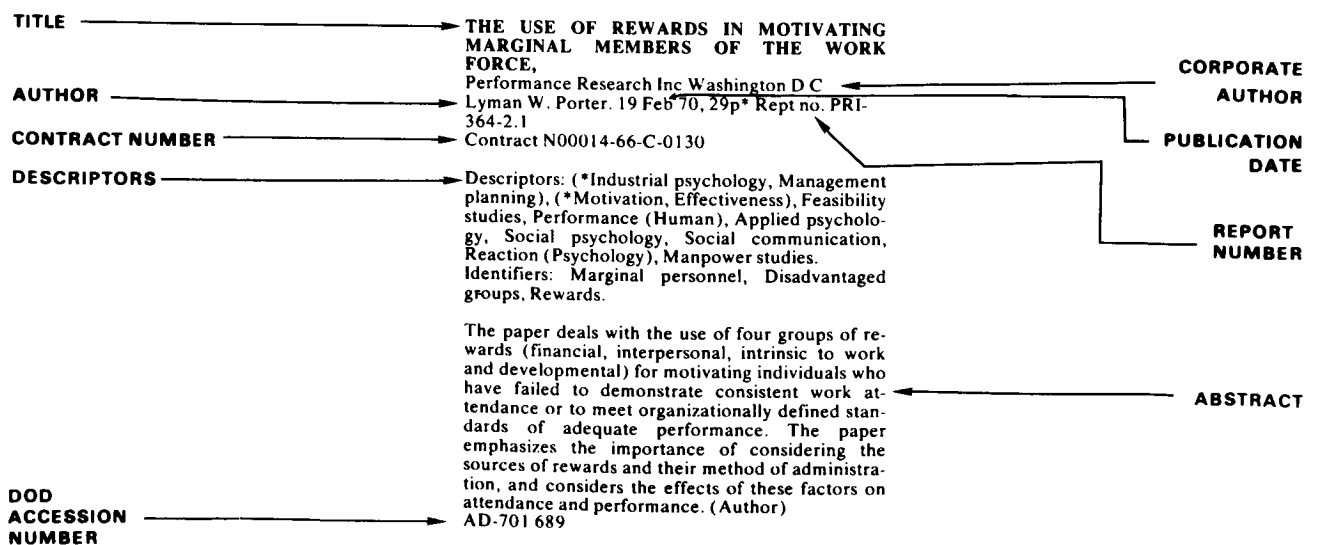
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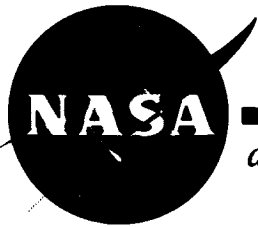


TYPICAL CITATION AND ABSTRACT FROM IAA



TYPICAL CITATION AND ABSTRACT FROM DDC





MANAGEMENT

a continuing literature survey

MAY 1971

STAR ENTRIES

M1 PROGRAM & PROJECT MANAGEMENT

N70-78474 George Washington Univ., Washington, D.C. Inst. for Management Science and Engineering.

RANDOM INVENTORY MODELS WITH BULK DEMAND AND STATE-DEPENDENT LEADTIMES

Donald Gross, Carl M. Harris, and James A. Lechner 22 Jun. 1970 32 p refs *Its* Serial-T-237

(N00014-67-A-0214)

(AD-710362) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-78132 Howard Research Corp., Arlington, Va.

A GENERALIZED PLAN FOR SYSTEM DEVELOPMENT PROGRAMS

Troy R. Bishop 5 Sep. 1962 19 p

(TN-0006-0) Avail: NTIS

System development programs may involve developing original equipment design, integrating existing systems, or adapting existing systems to new environments or requirements. Nevertheless, certain elements of system development programs are contained in all or most of these types of programs and vary only in their degree of prominence or of urgency. Some of these elements, or considerations, are discussed. The elements include: management planning; coordination; equipment design, manufacturing, acceptance, installation, test, and evaluation; training; operation; system overhaul, repair, and alteration; and technical publications. Author

N70-77203* National Aeronautics and Space Administration, Washington, D.C.

CONFIGURATION MANAGEMENT OFFICE MANUAL. CONFIGURATION MANAGEMENT OFFICE (MAP-6)

2 Dec. 1968 42 p refs

(NASA-TM-X-66356) Avail: NTIS

The requirements and internal operations of the Apollo Program Office, Configuration Management Office are described. Configuration is defined as the complete technical description required to fabricate, test, accept, operate, maintain, and logistically support systems, equipments, and components. Configuration management

is the formal set of procedural concepts by which a uniform system of configuration definition (identification), change management (control), and configuration status reporting (accounting) is established and maintained for all systems, equipment, and components.

Author

N70-76324* National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

APOLLO PROGRAM MANAGEMENT, VOLUME 3

Dec. 1967 118 p

(NASA-TM-X-65294) Avail: NTIS

The purpose is to describe in summary the MSFC segment of the total Apollo management process and to describe the methodologies and techniques currently being implemented. The MSFC document reflects the complexities inherent in a research and development environment as well as the magnitude of the management effort which has crystallized the many agencies, government and contractor, into a technical and management team with unified spirit and a common purpose. The program management process, as it is now being practiced, is presented in a sequence of five broad categories: function and scope of activity, program management concept, organization and relationships, management system elements, and current management systems improvements.

Author

N70-76095 Scripta Journals, Ltd., London (England).

ORGANIZATION AND ECONOMICS OF PRODUCTION

In its Instrumentation and Control, No. 12 Dec. 1968 p 51-53 refs

Avail: Issuing Activity

A problem is formulated for optimizing the time that information flows within a factory administrative control network. The problem can be reduced to one of finding the critical path in a network.

E.C.

N70-76093 Scripta Journals, Ltd., London (England).

AUTOMATED PRODUCTION CONTROL SYSTEM

In its Instrumentation and Control, No. 12 Dec. 1968 p 30-44 refs

Avail: Issuing Activity

The organizational structure and personnel qualifications for staffing a data processing center are discussed. Requirements are outlined for managers, programmers, systems analysts, the tape librarian, and clerical support personnel. Procedures for timing and scheduling center work tasks are also mentioned.

E.C.

N70-75898* National Aeronautics and Space Administration, Washington, D.C.

NASA APOLLO PROGRAM MANAGEMENT, VOLUME 1

Dec. 1967 163 p refs

(NASA-TM-X-65293) Avail: NTIS

The Apollo Program management system is summarized. Five sections describe: (1) the program and its scope in terms of complexity, schedules, requirements, demands on resources, and numbers of people involved; (2) the program management philosophy, concepts, and considerations which form the basis for organization structure, working relationships of the people involved, and the hardware required for the program; (3) how various elements of NASA, including the Office of Manned Space Flight, have been organized to manage the program, and the interrelationships between all participants including Government and industry; (4) the program management system including system elements, their meaning, and implication in the total management process; and (5) how the management system is assessed and how changes are made as changing requirements dictate.

Author

N70-35364# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

MANAGEMENT OF COMPUTER PROGRAMMING. PART 2: CASE STUDIES

Gerald W. Gill and Alton P. Jensen 1970 61 p

(Grant NSF GN-655)

(PB-190815; GITS-70-01) Avail: NTIS CSCL09B

The document is a background report to the authors' survey of present-day practices and problems of computer programming management. The report presents data collected in seven case studies on the following aspects: organization of computer programming efforts; personnel practices; standards; and management philosophies.

Author (USGRDR)

N70-33187# RAND Corp., Santa Monica, Calif.

INFORMATION SYSTEM DESIGN IN LARGE SCALE LOGISTIC SYSTEMS

E. P. Durbin Mar. 1970 17 p Presented at the NATO Conf., Luxembourg, 19-22 May 1970

(AD-703561; P-4308) Avail: NTIS CSCL5/2

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-31745* Syracuse Univ., N.Y.

PROJECT MANAGEMENT IN THE APOLLO PROGRAM INTERIM REPORT

E. E. Drucker, W. Pooler, D. L. Wilemon, and B. D. Wood Apr. 1970 35 p refs Presented at NASA, Washington, 29 Jun. 1970 (Grant NGL-33-022-090)

(NASA-CR-110497; IR-6223-R-1) Avail: NTIS CSCL05A

The purpose of this study was partly to update methods of modern project management, and partly to study NASA from a more objective, broader point of view and with greater articulation with the focus on the role of the project manager in the Apollo Program. It was found that the study of the project manager, the person, is inextricably entangled in the study of project management as an organization.

Author

N70-24989 Georgia Inst. of Tech., Atlanta

FIXED ASSET REPLACEMENTS AND ACQUISITIONS IN A TYPICAL FIRM IN THE AEROSPACE INDUSTRY

Kurt Askin (Ph.D. Thesis) 1969 252 p

Avail: Univ. Microfilms: HC \$11.50/Microfilm \$3.25 Order No. 69-19644

The purpose of this study is to set forth those factors

that influence decisions concerning the replacement and acquisition of machinery and equipment, as these decisions are made in a typical firm in the aerospace industry. Models for these decision-making processes are developed and solution procedures are established. The objectives of this research are: (1) definition of significant factors affecting fixed asset decisions facing a typical firm in the aerospace industry, (2) the development of realistic models in the relatively unique environment of an aerospace industry, and (3) the establishment of solution procedures for optimizing the criteria of effectiveness, subject to various constraints and period linking requirements. The present decision-making process concerning fixed asset investments as it occurs in TASC0, a typical aerospace firm, is presented to provide a realistic background for the proposed models. Also presented are discussions of centralization and decentralization of decisions at TASC0, relations with government, and the details of the planning and budgeting of fixed asset acquisitions.

Dissert. Abstr.

N70-22962# General Electric Co., Philadelphia, Pa. Space Div.
NEW DIMENSIONS IN PROJECT PLANNING AND CONTROL

James R. Polski and Roy W. Eaton Oct. 1969 32 p refs Presented at the 2d Intern. Congr. on Proj. Planning by Network Analysis, Amsterdam, 7 Oct. 1969

(PB-186499) Avail: NTIS CSCL05A

The discussion is chiefly concerned with schedule and resources planning, and the measurement aspects which lead to control, as well as the communications vital to accomplishing this. It is treated in the context of the design, development, and acquisition phases of the project life cycle.

Author (USGRDR)

N70-21109* Syracuse Univ., N.Y.

THE ROLE OF THE PROJECT MANAGER AND MANAGEMENT SYSTEMS IN THE MANAGEMENT OF THE APOLLO PROGRAM

Richard J. Hopeman and David L. Wilemon [1969] 9 p /ts Working Paper No. 1

(Grant NGL-33-022-090)

(NASA-CR-109195) Avail: NTIS CSCL05A

This research on project management with emphasis on specification of pertinent areas of inquiry and the methodologies which seem to be appropriate in the investigation of the areas of role of the project manager, organization and project management, and project management systems. It provides a unified frame of reference for the interdisciplinary team in terms of assuring that all significant dimensions of the project management study are researched. It also provides a document for general orientation purposes for those persons interested in the nature of the study and for persons within NASA who will be interviewed on particular topics.

Author

N70-21106* Syracuse Univ., N.Y.

MANAGING PRODUCT DEVELOPMENT SYSTEMS: A PROJECT MANAGEMENT APPROACH

David L. Wilemon Oct. 1969 18 p refs Submitted for publication Revised /ts Occasional Paper No. 4

(Grant NGL-33-022-090)

(NASA-CR-109180) Avail: NTIS CSCL05A

It is suggested that project management has significant value in managing a total new product development system in industry, especially by those firms developing, manufacturing, and distributing technical products. Project management is viewed as a potentially useful mechanism that can aid in integrating research and development and product commercialization. New Product development is proposed as an aid in mobilizing the organizational resources necessary for an efficient and effective new product development system.

Author

N70-13193# Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
MANAGEMENT OF A PROGRAMMING PROJECT: AN APPROACH

R. A. Tannert 15 Oct. 1969 37 p
 (Contract W-7405-eng-26)

(PB-186345; Y-DE-13) Avail: NTIS CSCL09B

It is the intent of the paper to describe an approach to the management and control of a programming project that attempts to tie together many of the various activities of a project from the original systems analysis and design to the final documentation and implementation. Author (USGRDR)

N70-11267*# National Aeronautics and Space Administration.
 John F. Kennedy Space Center, Cocoa Beach, Fla.
APOLLO PROGRAM MANAGEMENT, KENNEDY SPACE CENTER, FLORIDA, VOLUME 4

15 Jan. 1968 116 p refs

(NASA-TM-X-61995; Rept-130-12-0001-Vol-4) Avail: NTIS CSCL05A

The management functions applied to the Apollo Program Management System at the Kennedy Space Center (KSC) are described. Organizational concepts, management philosophy, and the application of management system elements to respond to the impact of the Apollo Program are considered. An example of the effective use of these management techniques is discussed, and plans for management improvements are highlighted. Author

N70-10997# Georgia Inst. of Tech., Atlanta. School of Information Science.

MANAGEMENT OF COMPUTER PROGRAMMING. PART 1: PRACTICES AND PROBLEMS

Gerald W. Gill and Alton P. Jensen 1969 23 p refs

(Grant NSF GN-655)

(PB-185470; GITIS-69-01) Avail: NTIS CSCL09B

The study investigates the management of computer centers, with emphasis on managing the programming effort. Problems and objectives of programming management are examined and techniques used in selected business and governmental organizations are presented. The data were collected by the case study method by surveying seven organizations. The particular aspects of the problem discussed in the report emphasize programming objectives and standards. Author (USGRDR)

M2 CONTRACT MANAGEMENT

N70-78316 RAND Corp., Santa Monica, Calif.
QUEUEING THEORETIC ANALYSIS OF CONTRACTORS' SEQUENTIAL BIDDING PROBLEMS, 1

Leonard H. Zacks Jul. 1970 30 p refs

(AD-710271; P-4412/1) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-74252 Assistant Secretary of Defense (Installations and Logistics), Washington, D.C.

THE DEFENSE-INDUSTRY JOINT COST REDUCTION WORKSHOPS, FEBRUARY APRIL 1967

31 May 1967 179 p

(AD-702614) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-41017# General Accounting Office, Washington, D.C.
ALLOWANCES FOR INDEPENDENT RESEARCH AND DEVELOPMENT COSTS IN NEGOTIATED CONTRACTS: ISSUES AND ALTERNATIVES, DEPARTMENT OF DEFENSE, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, AND ATOMIC ENERGY COMMISSION

16 Feb. 1970 118 p refs

Avail: Issuing Activity

Improved control by the DOD, AEC, and NASA over costs of bidding and related technical efforts charged to government contracts was studied by the GAO in independent research and development programs. Suggestion for establishing a government-wide policy are presented with alternatives and issues. The rights to royalty-free use of inventions under independent research programs, and the differences between the AEC and DOD-NASA policies are discussed. Comments by the Council of Defense and Space Industry Association, and government organizations are included. F.O.S.

M3 RESEARCH & DEVELOPMENT

N70-79132 Progress Management Services, Arlington, Va.
GUIDE TO PROBLEM ANALYSIS OF ADVANCED TECHNOLOGICAL OBJECTIVES. METHODOLOGY FOR PROBLEM RESEARCH

Robert J. Massey and Alexander G. Hoshovsky Feb. 1970 22 p

(F44620-68-C-0065)

(AD-711388; OAR-70-006) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-78957 Carnegie-Mellon Univ., Pittsburgh, Pa. Management Sciences Research Group.

RESEARCH AND DEVELOPMENT COORDINATION AS A PROBABILITY PROCESS

D. P. Gaver and V. Srinivasan Jan. 1970 15 p refs

(Contract Nonr-760(24))

(AD-711835; RR-193) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-76377* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering.

SOME PRELIMINARY EXPERIMENTS AND A MODEL OF INFORMATION-SEEKING STYLE OF RESEARCHERS, THIRD SESSION

Albert H. Rubenstein, Richard W. Trueswell, Gustave J. Rath, and David J. Werner Oct. 1966 16 p refs Presented at the 20th Natl. Conf. on the Admin. of Res., Miami, Oct. 1966

(NsG-495; PHS-LM-00098-01)

(NASA-CR-113540) Avail: NTIS

Progress is reviewed for a long term study program on the information-seeking or search behavior patterns of R and D scientists and engineers, including observations on the extent researchers use current awareness information services. A simplified model for information search behavior is discussed as well as a more complex model on the feedback and learning aspects of information searching. A ten year program of research on information-seeking behavior is outlined. Pilot studies are summarized including characterization of information-seeking styles of scientists and engineers, medical researcher search profiles, use of information services by X-ray crystallographers, and retrospective measures of information-seeking style. E.C.

N70-76369* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. LIAISON ACTIVITIES AT RESEARCH AND DEVELOPMENT INTERFACES: A MODEL, SOME EMPIRICAL RESULTS, AND DESIGN CONSIDERATIONS FOR FURTHER STUDY

Robert Crichton Mills, III (M.S. Thesis) Jun. 1967 148 p refs (NsG-495; N00014-66-C0020-A01)

(NASA-CR-113541; Rept-67/33) Avail: NTIS

A basic interface model is presented that identifies major sets of variables which influence liaison activities at research and development interfaces. Analyses of two empirical studies on liaison relationships are described. Although the settings vary, one proposition was common to both studies. It was found that there was marginally significant support for the proposition that liaison agents who were perceived as group members are also perceived as effective. An inverse relationship between distance and certain aspects of interface communication was supported. It was not possible to draw any firm conclusions about the behavior of liaison agents during project crises because of insufficient data. A discussion of methodological problems is included. Certain aspects of research design for field experimentation on interface activity are elaborated, and a potential experimental design for the study of liaison agent effectiveness is presented. Some possible data collection procedures and important elements of analysis of the potential design are included.

Author

N70-76368* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. PEOPLE, MODELS AND R AND D ORGANIZATIONS

Gustave J. Rath Jun. 1966 39 p refs Sponsored in part by ONR

(NsG-495)

(NASA-CR-113535; Rept-66/14) Avail: NTIS

The definition of concepts dealing with scientific manpower in R and D societies leads to the analysis of models and their use in the collection and analysis of data. The use of simulation as a tool to study R and D societies is considered. Different languages for the study of R and D societies are classified, compared and evaluated.

Author

N70-76367* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. STUDIES OF IDEA FLOW IN RESEARCH AND DEVELOPMENT

Albert H. Rubenstein Nov. 1963 17 p refs Conference held at New York, Nov. 1963 Revised

(NsG-495)

(NASA-CR-113536; Rept-63/16-Rev) Avail: NTIS

An example of field research in organization theory is described: a study of idea flow and project selection in R and D. A flow model of the source of projects in R and D laboratory is presented. A number of research questions are presented, along with the possible sources of theory and some testable propositions. The real-time measurement of idea flow in operating R and D laboratories is discussed briefly.

Author

N70-76366* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. SOME MODELS OF ORGANIZATIONAL INTERFACES IN THE R AND D

PROCESS

Charles F. Douds and Albert H. Rubenstein Mar. 1966 21 p refs

(NsG-495; N00014-66-C0020-A01)

(NASA-CR-113537; Rept-66/6) Avail: NTIS

Working definitions are developed for the terms: interface, liaison, communication gap, transition and coordination interfaces. Interfaces and the liaison role are treated in terms of communication problems requiring coordination at the working group level as well as at the supervisory level. A general interface model is presented and the transmission process is developed in a detailed model.

Author

N70-76364* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. AN ANALYSIS OF SELECTED STRATEGIES OF ORGANIZING R AND D IN DEVELOPING COUNTRIES WITH REFERENCE TO POLICY AND PLANNING TECHNIQUES, INTERNATIONAL RELATIONS MANPOWER AND TRAINING, AND INFORMATION REQUIREMENTS

Earl C. Young Feb. 1966 74 p refs

(NsG-495)

(NASA-CR-113542; Rept-66/5) Avail: NTIS

An exploration is described of the set of problems confronting developing countries in their attempts to build a scientific and technological capability. The major topics explored include scientific policy, research planning in relation to economic planning international scientific relations, manpower and training problems and the flow of scientific information. Scientific objectives collected from policy statements were classified to determine the nature of scientific goals in these countries. Strategies at the international regional, and national level were identified in order to determine the means used to obtain these goals and to describe selected R and D patterns which appear to be emerging. Several statements that can be operationalized as testable propositions were collected and classified. Major trends noted and analyzed include the major role played by the national government in establishing and controlling scientific activities, the growing importance of international relations, the widespread and strong orientation to economic development projects, and the almost universal desire to establish an indigenous scientific capability.

Author

N70-76360 Oak Ridge Natl. Lab., Tenn. Metals and Ceramics Div.

COST DISTRIBUTION: A METHOD OF DIRECTING COSTING IN RESEARCH INSTALLATION

Roy G. Cardwell May 1970 13 p

(W-7405-eng-26)

(ORNL-TM-2921) Avail: NTIS

Collection of general and miscellaneous costs in a single operating account by cost element and the distribution of that account total based on technical labor is a good general accounting method that offers simplicity, saves technical time, and reduces bookkeeping. Such a system is more practical and efficient when the data can be processed and the report prepared on a computer. The resulting cost information is divided into direct program costs, by cost element, and general laboratory cost totals; however, the laboratory figures can be recast into their original elements against each program for historical and planning purposes.

Author

N70-74111 RAND Corp., Santa Monica, Calif. Cost Analysis Dept.

WHAT DO WE MEAN BY RESEARCH AND DEVELOPMENT (QUES)

David Novick 25 Aug. 1959 52 p refs
(AD-700756; P-1779) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-71640 National Science Foundation, Washington, D.C.
NATIONAL PATTERNS OF R AND D RESOURCES. FUNDS AND MANPOWER IN THE UNITED STATES, FOR THE PERIOD 1953-1970

Sep. 1969 42 p refs
(NSF-69-30) Avail: SOD

Patterns of funds and scientific personnel utilization among the various sectors of the economy are summarized. The estimates for 1970 are presented both for the R and D totals and in separate transfer tables for basic research, applied research, and development. The contributions of state and local agencies to R and D funding and performance are also shown along with estimates of the scientific and engineering manpower employed by each sector in carrying on its R and D activities. Author

N70-41368# General Accounting Office, Washington, D.C.
MANAGEMENT OF FEDERALLY FINANCED RESEARCH BY THE UNIVERSITY OF MICHIGAN, A CASE STUDY: B-117219 Report to the Congress

Elmber B. Staats 25 Sep. 1970 129 p refs
Avail: Issuing Activity

The management of research supported by the Federal Government was studied at the University of Michigan by the GAO. Among the findings are the following: (1) The usable space in the university's physical structures devoted to research nearly equaled that used for instruction. (2) A large part of \$90.5 million worth of university-owned equipment and \$22.5 million worth of government-owned equipment was used for research. (3) Of 21,400 people, 8,000 worked full- or part-time directly on research: 800 teaching faculty, 1,300 research personnel, 2,400 nonacademic personnel, and 3,500 graduate and undergraduate students. (4) In general, the university's management of federally financed research was in harmony with the management needs of the university and the requirements prescribed by the Federal agencies. (5) The time lag between the payment of project costs and the reimbursement by the Federal agencies requires the university to use about \$3.6 million of its own funds monthly. It is recommended that the feasibility of adopting a uniform system of providing universities with sufficient advanced funds for programs financed by all agencies be studied. F.O.S.

N70-33934*# Syracuse Univ., N.Y.
INTERDISCIPLINARY RESEARCH IN THEORY AND PRACTICE: A VIEW FROM THE UNIVERSITY

William Edgar Davis, III (M.S. Thesis) Apr. 1970 157 p refs
(Grant NGL-33-022-090)
(NASA-CR-109888; Rept-6221-TD-1) Avail: NTIS CSCL 05A

The interdisciplinary research supported by NASA's Sustaining University Program is investigated. A multidisciplinary research team is defined as a group with members from two or more disciplines, and an interdisciplinary group is as characterized by cooperative, coordinated, and sustained interaction between members of different disciplines. It is concluded that NASA's intention to encourage interdisciplinary research was in most cases not realized. The main difficulties are identified as the following: Many university people do not understand the foundation underlying such research and do not perceive the potential utility and value. Only some researchers consider its utility great enough to justify the risks and difficulties. Many university researchers and administrators are reluctant to encourage such research because they anticipate they cannot do so effectively. A lack of distinction between multidisciplinary and interdisciplinary research by both university and

NASA personnel resulted in too much of the former. The agency's emphasis on 'multidisciplinary' research combined with the universities' indiscriminating scramble for funds resulted in confusion of means and ends. Few agency and university people really pursued the task with much conviction, initiative, and design. N.E.N.

N70-32883*# New Mexico, Albuquerque. Dept. of Public Administration.

UTILIZING LATERAL ORGANIZATIONAL PATTERNS IN A RESEARCH AND DEVELOPMENT FUNCTION: MISSION PLANNING FOR MANNED SPACEFLIGHT

Leslie James Sullivan (M.A. Thesis) Jun. 1970 220 p refs
(Grant NGL-32-004-042)
(NASA-CR-109827) Avail: NTIS CSCL 05A

The Apollo mission planning organizational structure, which exhibits singular lateral patterns of organization, is studied. Three working hypothesis are postulated: The mission planning structure is a representative example of the multiple, overlapping group concept; line supervisors are the major factor integrating the activities of the cross-functional groups into overall organization; and the use of multiple, overlapping groups is an extremely valuable tool in achieving coordination. A survey of organizational literature is made to identify relevant concepts, an analysis of the mission planning structure is made based on agency sources, and information is utilized from a questionnaire submitted to members of the cross-function groups. It is concluded that the hypotheses are verified. It is also suggested that the concept of cross-functional groups may have an important implication for effective committee usage and the managers systematically consider lateral coordination patterns in designing and updating their organizations. Author

N70-32882*# New Mexico Univ., Albuquerque. Dept. of Public Administration.

THE IMPACT OF THE CHANGING ENVIRONMENT ON THE MANAGEMENT OF LARGE SCALE PUBLIC SCIENCE PROGRAMS

Robert V. Battey (M.A. Thesis) Jun. 1970 129 p refs
(Grant NGL-32-004-042)
(NASA-CR-109826) Avail: NTIS CSCL 05A

The objective of this paper is to propose a mechanism for reversing the trend toward ever increasing program costs. Specifically, the proposition is that government contracting agencies should become their own integrating contractor. The primary reason for this proposal is to avoid the huge, long-term contracts that have traditionally required the winning contractor to hire great numbers of additional personnel only to dismiss them again as their portion of the program is completed. Also, by contracting directly with subcontractors, the government can reduce the compounding of overhead charges. Computer technology was seen as a tool for assisting in the accomplishment of future programs without hiring massive, temporary staffs. Current status and suggestions for the utilization of these computers were obtained from recent trade journals and by interviewing key management personnel. Author

N70-32881*# New Mexico Univ., Albuquerque. Dept. of Public Administration.

ROLES OF SCIENTISTS AND ENGINEERS IN RESEARCH AND DEVELOPMENT CONTRACTING

Larry Glenn Damewood (M.A. Thesis) Jun. 1970 334 p refs
(Grant NGL-32-004-042)
(NASA-CR-109825) Avail: NTIS CSCL 05A

An overall perspective on the contracting system for research and development is presented and the major roles of scientists and engineers in the process are described. Multiple research techniques are utilized, including interviews and observation of contracting practices. The principal methodology is an analytical descriptive study of the literature, especially government regulatory documents. The evolution of the contract system is traced, and the political.

social, and economic implications of the system are considered. In describing the roles of scientists and engineers, the entire contracting spectrum is covered from early planning to contract management. Research indicates that scientists and engineers have not recognized the contract system as a management tool. Both positive and negative results are noted from the informal relationship between government and nongovernment scientists and engineers. This research is a step toward preparing technical professionals for contracting roles. Author

N70-32678*# University of Southern Calif. Los Angeles
**TOWARD AN ORGANIZATIONAL ACCOUNTING SYSTEM
 FOR GOVERNMENT LABORATORIES**

Ross Clayton Feb. 1970 36 p refs

(Grant NGL-05-018-098)

(NASA-CR-110760) Avail: NTIS CSCL 05A

The assessment of a particular type of complex organization, the government laboratory is studied. In recent years a considerable growth has taken place in the amount of funds expended for research and development both in the private sector and in government. Concomitantly, increased concern was expressed about the health and effectiveness of the government's in-house laboratories. One response to the growing interest in developing new methods for evaluating these laboratories is given. A discussion is presented of a rationale and methodology for an organizational accounting system containing a set of measures which should serve to lower the degree of subjectivity required in the assessment process. Author

N70-31462# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.

**OPTIMAL CONTROL OF RESEARCH AND DEVELOPMENT
 EXPENDITURES**

Carl W. Hamilton Dec. 1969 131 p refs

(Contract DA-31-124-ARO(D)-209)

(AD-702918. TR-48. AROD-968-57-M) Avail: NTIS CSCL 12/2

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-31351# Army Logistics Management Center, Fort Lee, Va.
THE NATION'S RESEARCH AND DEVELOPMENT EFFORT

Alan R. Loper 1969 29 p refs

(AD-704364. ALM-2416-H) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-26963# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

**QUESTIONS ON ECONOMICS AND PLANNING OF
 SCIENTIFIC RESEARCH: COLLECTION OF ARTICLES**

L. S. Blyakhman et al 16 Oct. 1969 290 p refs Transl. into ENGLISH from Vop. Ekon. i Planirovaniya Nauchn.-Issled. (USSR), 1968 p 1-198

(AD-701031; FTD-MT-24-195-69) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-22234# Denver Research Inst., Colo.
**CONTRACT RESEARCH AND DEVELOPMENT ADJUNCTS
 OF FEDERAL AGENCIES: AN EXPLORATORY STUDY OF
 FORTY ORGANIZATIONS**

John G. Welles, Dean C. Coddington, J. Gordon Milliken, Catherine C. Blakemore, John S. Gilmore et al Mar. 1969 413 p refs

(Contract NSF C-477)

(PB-187945) Avail: NTIS CSCL 05A

The organizations were primarily engaged in one or more of four research and development (R and D) activities: basic research, applied research and development, systems analysis and planning, and systems engineering and technical direction. The primary purpose of the study was to provide a better understanding of these organizations by placing them in historical and institutional perspective relative to other types of organizations which performed R and D for the Federal Government, including Federal laboratories. Within the limits of an exploratory effort, the study specifically sought to determine if it was feasible to provide a broad frame of reference for classifying and examining the role of centers; to identify their unique characteristics, if any, as compared to other types of Federal R and D performers. Author (USGRDR)

N70-21728* Syracuse Univ., N.Y. Dept. of Mechanical and Aerospace Engineering.

INTERDISCIPLINARY RESEARCH IN A UNIVERSITY

Bernard D. Wood 24 Apr. 1969 12 p Presented at Cocoa Beach, Fla., 24 Apr. 1969 /Its Occasional Paper No. 3

(Grant NGL-33-022-090)

(NASA-CR-109262) Avail: NTIS CSCL 05A

The importance and difficulty of doing interdisciplinary research at a university are discussed. The distinction is made between an interdisciplinary group, which is a partnership of equals with different academic backgrounds, and a multidisciplinary group, in which each specialist works on his own product and someone else combines them in a meaningful way. It is felt that interdisciplinary research should be undertaken, it is impeded at most universities, it is more difficult to engage in than monodisciplinary research, and not everyone should undertake it. The two greatest problems are identified as the continuous acceptance of mutual goals, and group cooperation even if it requires relinquishment of individual aspirations. N.E.N.

N70-21727* Syracuse Univ., N.Y.

**INTERDISCIPLINARY EFFORT: RESEARCH OR
 PROBLEM-SOLVING?**

Eugene E. Drucker Sep. 1969 10 p /Its Occasional Paper No. 6

(Grant NGL-33-022-090)

(NASA-CR-109263) Avail: NTIS

Interdisciplinary groups are ideally suited to attack and solve complex problems, because each member of the group works along the traditional lines of his discipline, on a task which is well defined and relatively independent of the others. In order for an interdisciplinary group to do true research successfully, however, there must exist a combination of conducive physical and administrative facilities, compatible personnel, and above all a research topic whose investigation genuinely requires the cross-fertilization and critical lay evaluation of ideas by members of various disciplines. This combination is difficult to arrange, so that the existence of true interdisciplinary research is a rarity. Interdisciplinary research is inefficient compared to conventional research, but it is of great benefit to individual participants. In universities, the greatest stimulant to interdisciplinary research is administrative independence of the research organization from the departments and colleges. Author

N70-21105*# Syracuse Univ., N.Y.

**A PROJECT MANAGEMENT APPROACH TO
 INTERDISCIPLINARY RESEARCH IN UNIVERSITIES**

R. J. Hopeman and D. L. Wilemon 9 Jun. 1969 21 p Revised /Its Occasional Paper No. 2

(Grant NGL-33-022-090)

(NASA-CR-109179) Avail: NTIS CSCL 05A

The objective is to explore the problems and prospects

of encouraging meaningful interdisciplinary research in universities and suggest ways in which a project management approach can be applied. The ideas presented are based on experience with a grant from NASA to investigate the role of the project manager and management systems within the Apollo program. Additionally, some of the thoughts are derived from our deal construct of what interdisciplinary research should encompass. Author

N70-18659# Office of the Director of Defense Research and Engineering, Washington, D.C. Office for Lab. Management.
EVALUATION OF RESEARCH AND DEVELOPMENT ORGANIZATIONS

E. M. Glass 31 Jul. 1969 13 p refs
 (AD-697343; MAN-69-3) Avail: NTIS CSCL 5/1

One of the problems identified by the Director of Defense Research and Engineering, in his high-priority effort to strengthen the Department of Defense in-house laboratories, concerned the evaluation of research and development organizations. The report describes a peer rating experiment which was an attempt to gain greater insight into the relationship of management and organizational performance with organizational characteristics. Author (TAB)

N70-18480# Syracuse Univ., N.Y.
REFLECTIONS ON INTERDISCIPLINARY RESEARCH

Richard J. Hopeman and David L. Wilemon Apr. 1969 22 p
 /Its Occasional Paper No. 2
 (Grant NGL-33-022-090)
 (NASA-CR-107955) Avail: NTIS CSCL 05A

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-14847# University of Southern Calif., Los Angeles, Management Lab.

MANAGEMENT PROBLEMS: THE RESEARCH AND APPLICATIONS INTERFACE

Milton G. Holmen, Peggy Sanders, Richard P. Nortman, and Allyn R. Franklin 16 Dec. 1969 18 p refs
 (Grant NGL-05-018-098)

(NASA-CR-107430) Avail: NTIS CSCL 05A

The need for research which will help managers bridge the gap between management theory and application of the theory to their real situations is discussed. A number of interaction exercises currently in use to involve managers in significant learning experiences and in feedback processes which help them relate the exercises to their work situations are discussed. Methods are presented by which managers may become aware of the kinds of problems that may exist in their work groups, potential ways to solve these problems, and ways to structure organizations for greater efficiency. Author

N70-14397# National Aeronautics and Space Administration, Washington, D.C.

R AND D REPORTING: GUIDANCE FOR TECHNICAL MONITORS OF NASA CONTRACTS

1969 16 p
 (NASA-SP-7034) Avail: NTIS CSCL 05B

Options that monitors may use in directing the preparation and dissemination of NASA research and development reports are cited. Emphasis is placed on contract reporting requirements, documenting technology innovations, and effective utilization of NASA's scientific and technical information system. J.M.C.

N70-13006# British Iron and Steel Research Association, London (England). Operational Research Dept.

THE EVALUATION AND SELECTION OF RESEARCH PROJECTS

R. D. Reader and C.J. Beattie 1969 8 p
 (PB-186165; OR/149167) Avail: NTIS CSCL 05A

The report discusses the value of formal methods for the evaluation and selection of research projects, and shows that the practical applications of such methods can be of very great benefit to a research manager. Particular reference is made to the procedure currently used in the British Iron and Steel Research Association, Operational Research. Department for the choice of its annual research program. Author (USGRDR)

M4 MANAGEMENT TOOLS & TECHNIQUES

N70-79103 Auburn Univ., Ala. Digital Systems Lab.
AN EFFICIENT ALGORITHM FOR SCHEDULING INDEPENDENT TASKS

L. J. Wilkerson and J. D. Irwin Aug. 1970 101 p refs
 (DAAH01-68-C-0296; Proj. Themis)
 (AD-711543; THEMIS-AU-T-15) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-79088 Pittsburgh Univ., Pa. Graduate School of Library and Information Sciences.

INFORMATION SYSTEM DESIGN METHODOLOGY BASED ON PERT/CPM NETWORKING AND OPTIMIZATION TECHNIQUES Final Report, 15 Apr. 1968 - 1 Aug. 1970

Anindya Bose (Ph.D. Thesis) 1970 230 p refs
 (N00014-67-A-0402-0004; NIH FR-00250)
 (AD-711670) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-79085 Naval Postgraduate School, Monterey, Calif.
DERIVATION OF ADDITIONAL PROBABILISTIC INFORMATION FOR ANALYZING DECISIONS UNDER RISK

John Patrick Dowling, Jr. (M.S. Thesis) Sep. 1970 41 p refs
 (AD-713050) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-79078 Naval Postgraduate School, Monterey, Calif.
A MONTE CARLO PERT ANALYSIS SYSTEM UTILIZING THE GRAPHIC DISPLAY OF AN IBM 360 COMPUTER

Robert A. Kottke, Jr. (M.S. Thesis) Jun. 1970 93 p refs
 (AD-712461) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-78960 Air Force Systems Command, Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
A MANAGEMENT TECHNIQUE FOR IN-HOUSE RESEARCH PROGRAMS

T. J. Baker Jan. 1970 22 p
 (AD-711382; AFFDL-MR-70-1) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-78895 Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.

A BASIS FOR TIME AND COST EVALUATION OF INFORMATION SYSTEMS

R. R. Korfhage and T. G. De Lutis Jun. 1969 46 p refs Presented at the 6th Ann. Natl. Inform. Retrieval Colloq., 8-9 May 1969

(Grant NSF GN-759)

(PB-188946; RM-69-6) Avail: NTIS

The paper proposes a general model for information storage and retrieval, IS and R systems. In the model an IS and R system is visualized as distinct levels of functional components where each level looks upon the totality of all lower levels as a black box which accepts inputs and returns outputs. The system is selected from the set of all available IS and R components. These components define the system's users and data sources; the hardware, software, and personnel performing the actual storage and retrieval activities; and the funder who acts as a filter in the selection of the other components comprising the system. The outermost level, the ecosystem, includes the funder, the user groups, and the data sources. All other levels belong to the endosystem. Each level within the endosystem consists functionally of processing components and storage components. It is proposed that a measure of the endosystem performance, as a function of the time to complete a requested service, can be obtained by specifying the characteristics of these functional components for a specific hardware/software configuration and the characteristics of the user groups. Finally, the selection process for all system components is related to the performance of the endosystem, and to the cost for this level of performance as a function of the ecosystem. Author (USGRDR)

N70-78872 Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Advanced Systems Planning.

AN EXPANSION OF THE IMPROVEMENT CURVE TO ALLOW ITS USE WITH A COMMON/PECULIAR PRODUCTION MIX

W. W. Baker and J. Silver Mar. 1967 21 p

(AD-712381) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-78576 Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.

THE FILE SEARCHING, RECORD VALIDATING AND RECORD FORMATTING FUNCTIONS OF THE SUPERVISOR FOR AN EXTENDED DATA MANAGEMENT FACILITY

Agu Raymond Ets Aug. 1970 111 p refs

(N00014-67-A-0216-0014)

(AD-710386; Rept-71-04) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-77844 Sandia Corp., Albuquerque, N.Mex. Safety Engineering Div.

RECOMMENDED SAFETY GUIDES USED AT SANDIA LABORATORIES

William W. Allison Jan. 1970 70 p refs Revised

(SC-M-68-378-Rev) Avail: NTIS

The safety guides cover the use of compressed gases, pressure and vacuum apparatus, electrical equipment, vehicles, and protective clothing. Guides are also given on hazard control, chemical safety, office safety, and accident investigations. A bibliography is included. E.C.

N70-76669 Boeing Co., Seattle, Wash. Industrial Relations.

IMPROVEMENT CURVE

William F. Brown, Roy W. Smith, William C. Lansing, and Henry G. Horton Aug. 1968 94 p refs Revised

Avail: NTIS

The manual is prepared as a basic text to enable the student to understand the theory of the improvement curve and how the theory was developed by industry. The course materials are presented in a manner designed to lead the student in an easy, step-by-step approach to the practical use of the curve. Except in a few instances mathematics is limited to simple arithmetic. However, formulae and tables are included as an addendum for those who wish to pursue the subject further. Emphasis is placed on the primary value: the cost in dollars or manhours required to produce the first unit. Based on this value, and using techniques explained in the manual, future costs are predicted. Author

N70-76380* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. MANAGEMENT SCIENCE IN UNIVERSITY OPERATION

Gustave J. Rath Jul. 1965 15 p refs Conf. held at Dallas. 17-19 Feb. 1966

(NsG-495)

(NASA-CR-113539; Rept-66/19) Avail: NTIS

The state of the art of Management Science in university operation is discussed, in view of the increased demand for excellence in education, the large-scale expenditures for educational services, and the concern within the university with the acceptance of change. After a brief resume of the early work in the field of university operation, simulation, scheduling, institutional research, and automated instruction are examined. A prognosis for the future and its effect upon the student is provided. Author

N70-76126* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

PERT AND COST CORRELATION TECHNIQUE (PACCT) OPERATIONS MANUAL, DRAFT

Jun. 1967 78 p refs

(NASA-TM-X-65247) Avail: NTIS

The purpose of the PERT and Cost Correlation Technique (PACCT) operations manual is to: (1) Describe the PACCT concept and approach. (2) Provide guidelines for general application of the PACCT system. (3) Describe the computer system including input, output, and processing requirements. (4) Provide a means for maintaining a reference document of the PACCT system as it is developed and applied to NASA programs. Author

N70-75775* Bellcomm, Inc., Washington, D.C.

PROCEDURES FOR MANAGEMENT CONTROL OF COMPUTER PROGRAMMING IN APOLLO

B. H. Liebowitz, C. S. Sherrerd, and E. B. Parker, III 15 Jun. 1967 184 p refs Revised

(NASw-417)

(NASA-CR-113049; TR-66-320-2-Rev) Avail: NTIS

Techniques are documented for use by an agency responsible for specifying the requirements for a program, and monitoring and controlling the efforts of the contractor (or in-house group) producing the program. The report presents: (1) A suggested format and content for the detailed computer program specification. The specification describes the performance requirements for the computer program and the finished computer program. (2) Configuration management procedures by which change control can be effected, technical reviews of the contractor's design can be

made, and program and specification status can be documented. (3) Suggested milestones by which the progress of the task can be evaluated, and formats for periodic reporting on the status of the task. (4) Recommended tests for verifying the design and implementation of computer programs. (5) Guidelines for programming standards. (6) For those efforts which are formally contracted, guidelines for producing a Statement of Work which specifies the technical and management control requirements for the task. Author

N70-75774* National Aeronautics and Space Administration, Washington, D.C.

PERT AND COST CORRELATION TECHNIQUE (PACCT)

23 Dec. 1966 44 p

(NASA-TM-X-65105; SC-006-003-1A) Avail: NTIS

The PERT and cost correlation technique makes more effective use of schedule and cost information in evaluating and controlling contractor performance. The initial step is the assignment, by machine process, of the program planned cost to summary PERT activities. As the PERT network is revised and updated, two basic calculations are made: a program cost projection based on new PERT expected dates and a value of work performed based on work completed. The value of work performed is compared with actual costs to calculate a value index, an indicator of contract performance effectiveness. The PERT expected cost is adjusted by the value index to give the PACCT forecast which is compared with the original program planned cost to predict total run-out cost and indicate shifts in funding peak requirements from the original plan. Author

N70-74644 RAND Corp., Santa Monica, Calif.

AN INTRODUCTION TO EQUIPMENT COST ESTIMATING

C. A. Batchelder, H. E. Boren, Jr., H. G. Campbell, J. A. Dei Rossi, and J. P. Large Dec. 1969 135 p refs
(DAHC15-67-C-0150)

(AD-702424; RM-6103-SA) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-74546 RAND Corp., Santa Monica, Calif.

COST-EFFECTIVENESS: SOME TRENDS IN ANALYSIS

E. S. Quade Mar. 1970 27 p

(AD-703387; P-3529-1) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-72538 Defense Supply Agency, Alexandria, Va.

REPORT OF SIMULATION OF VARIOUS DEMAND FORECASTING TECHNIQUES

Jun. 1968 58 p refs

(AD-698831) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-72230 Case Inst. of Tech., Cleveland, Ohio. Operations Research Group.

ADVANCED MATERIEL SYSTEMS PLANNING

Burton V. Dean and Lawrence E. Hauser Sep. 1966 85 p refs
(Nonr-1141(19))

(AD-697971; TM-65) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-71828 RAND Corp., Santa Monica, Calif.

THE ROLE OF QUANTITATIVE ANALYSIS AND THE COMPUTER IN PROGRAM BUDGETING

David Novick Oct. 1967 9 p refs Presented at the Inst. for Budget and Management Training, Natl. Assoc. of State Budget Officers, Nat. Bridge State Park, near Lexington, Ky., 20 Sep. 1967 (P-3716) Avail: NTIS

The place and value of quantitative analysis techniques in program budgeting are assessed. It is emphasized that budget policy makers need not be experts in mathematical modeling or computer technology themselves, but they should take full advantage of the services of analysts in this field when making budgetary decisions. E.C.

N70-42966# Office of Research Analyses, Holloman AFB, N.Mex.

LOG-NORMAL DISTRIBUTION ANALYSIS OF THE AEROSPACE RESEARCH PROJECTS

Eugene Kosik Apr. 1970 35 p refs

(AD-709867; ORA-70-0004) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-41936# RAND Corp., Santa Monica, Calif.

LEARNING-CURVE TABLES. VOLUME 3: 86-99 PERCENT SLOPES

H. E. Boren, Jr. and H. G. Campbell Apr. 1970 286 p

(Contract F44620-67-C-0045)

(AD-709178; RM-6191-PR-Vol-3) Avail: NTIS CSCL 14/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-41599# Princeton Univ., N.J. Dept. of Psychology.

THE MEASUREMENT AND DEVELOPMENT OF MANAGEMENT INFORMATION SYSTEMS Final Report

Harold M. Schroder Sep. 1970 24 p refs

(Contract N00014-67-A-0151-0020)

(AD-709412) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-41154# Stanford Research Inst., Menlo Park, Calif.

COMPUTER AUGMENTED MANAGEMENT SYSTEM RESEARCH AND DEVELOPMENT OF AUGMENTATION FACILITY Final Technical Report, 8 Feb. 1968 - 8 Feb. 1970

D. C. Engelbart Apr. 1970 348 p refs

(Contract F30602-68-C-0286)

(AD-709211; RADC-TR-70-82) Avail: NTIS CSCL 9/2

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-40834# Naval Ship Systems Command, Washington, D.C.

ILS DEVELOPMENT AND IMPLEMENTATION

Richard Dangel 1970 48 p refs Presented at the 7th Ann. Tech. Symp. of Assoc. of Senior Engr., 1970

(AD-709123) Avail: NTIS CSCL 17/7

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-40727# RAND Corp., Santa Monica, Calif.
LEARNING-CURVE TABLES. VOLUME 2: 70-85% SLOPES
 H. E. Boren and H. G. Campbell Apr. 1970 326 p
 (Contract F44620-67-C-0045)
 (AD-708714; RM-6191-PR-Vol-2) Avail: NTIS CSCL 14/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-40726# RAND Corp., Santa Monica, Calif.
LEARNING-CURVE TABLES. VOLUME 1: 55-69% SLOPES
 H. E. Boren, Jr. and H. G. Campbell Apr. 1970 323 p refs
 (Contract F44620-67-C-0045)
 (AD-708713; RM-6191-PR-Vol-1) Avail: NTIS CSCL 14/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-37876# System Development Corp., Falls Church, Va.
 Commercial Systems Div.
TIME SHARED/DATA MANAGEMENT SYSTEM. CDMS
EXAMPLES: QUERY, COMPOSE, DISPLAY
 [1970] 29 p
 (TID-25385) Avail: NTIS

The Management Reporting and Control data base described in these pages is based on the PERT project control method. The data base is designed specifically for practical day-to-day management applications and not for theoretical or mathematical use. It is designed to give managers simple, concise answers to questions regarding completion dates, manning and costs. The data base is designed for use with CDMS. SDC's time-shared data management system. It is responsive to user needs in that queries can be answered and reports can be generated, based on the latest data immediately after the data are changed or updated. NSA

N70-37484# California Univ., Livermore. Lawrence Radiation Lab.

MANAGEMENT OF COMPUTER AUTOMATION IN THE SCIENTIFIC LABORATORY

Jack W. Frazer 10 Dec. 1969 10 p Presented at Symp. Shared Program Controller, Albuquerque, N. Mex., 23-24 Sep. 1969 Submitted for publication. Supported in part by AEC
 (PB-189386; UCRL-72162) Avail: NTIS CSCL 09 B

The paper discusses the scientific laboratory manager's consideration and problems in choosing a data processing system for a laboratory. USGRDR

N70-37290 Ohio State Univ., Columbus. Computer and Information Science Research Center.
INFORMATION SCIENCE AS AN AID TO DECISION-MAKING
 Ronald L. Ernst and Marshall C. Yovits Sep. 1969 26 p refs
 (Grant NSF GN-534.1)
 (PB-189666; CISRC-TR-69-13) Avail: NTIS CSCL 05 A

The organization of two important areas which interact strongly: information science and decision-making is considered. Both are commonly and extensively used in a variety of ways and share an equally commonly and extensively used variety of definitions. In order to organize or to relate information science and decision making to each other, a number of important criteria must be considered. For example, the organization or interrelationship should have generality, applicability, utility, reality, and the potential for quantification. A generalized information system defined in detail, satisfies all of these criteria. Author (USGRDR)

N70-36873# Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.

DESIGN CONSIDERATIONS FOR A LARGE COMPUTING SYSTEM WITH A GEOGRAPHICALLY DISPERSED DEMAND

Richard Peebles Mar. 1970 35 p refs
 (Contract N00014-67-A-0216-0007)

(AD-702759; Rept-70-21) Avail: NTIS CSCL 9/2

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-36453# Resource Management Corp., Inc., Bethesda, Md.
THEORY AND IMPLEMENTATION OF COST AND BENEFIT ANALYSIS OF TRANSPORTATION SYSTEMS: THE NECTP
 Luis Sanchez, Osker Morgenstern, Klaus-Peter Heiss, Kan-Hua Young, and Solita Monsod Dec. 1969 298 p refs Prepared in cooperation with Mathematica, Inc.
 (Contract DOT-FR-9-0044)
 (PB-190945; NECTP-225) Avail: NTIS CSCL 13 B

The report presents the theory and application of transportation cost analysis methodology within a framework based on economic efficiency principles and on the application of welfare economics to decision-making in the transportation sector. The principles governing the efficient allocation of resources in transportation are set forth and adjustments required for market imperfections are discussed. Economic theory is applied to costing methods and techniques, and finally both transportation cost and productivity are brought together within a Pareto optimal framework for purposes of exploring the proper use of costs in decision-making. Author (USGRDR)

N70-35637# Congress. House. Committee on Government Operations.

EFFECTIVE AND EFFICIENT USE OF COMPUTERS IN CONGRESS

Washington GPO 1969 55 p refs Hearing on H.R. 404 and H.R. 5522 before Comm. on Govt. Operations, 91st Congr., 1st Sess., 23 Apr. 1969

Avail: Subcomm. of the Comm. on Govt. Operations

The hearings concerning the use of advanced electronic data processing techniques in the Bureau of the Budget are reported. The use of an efficient computer system to serve as a management tool in decision making by Congress is discussed. A synopsis of the McKinsey study of strengthening the planning, programming, and budgeting in the Bureau of the Budget is included. F.O.S.

N70-34839# George Washington Univ., Washington, D.C. Logistics Research Project

AUDITING LARGE-SCALE MANAGEMENT INFORMATION SYSTEMS: THE NAVY MAINTENANCE DATA COLLECTION SYSTEM

Sheldon E. Haber, Frank W. Segel, and Henry Solomon 12 Mar. 1969 32 p refs

(Contract N00014-67-A-0214)

(AD-704890) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-34681# C-E-I-R, Inc., Washington, D.C. Professional Services Div.

TOTAL INTEGRATED ENGINEERING SYSTEM (TIES). PROJECT DATA FILE, VOLUME 1 Final Report

Mar. 1970 130 p

(Contract FH-11-6957)

(PB-190954) Avail: NTIS CSCL 13B

A series of utility computer programs, written in COBOL language, level F, were developed for the purpose of facilitating the structuring of an integrated series of engineering application programs. The routines provide a standardized method for the communication between application programs and a data file. They were developed specifically for the Total Integrated Engineering System. There are seven separate routines that make up the storage

and retrieval utility. They provide for loading and unloading a master copy of the data file using magnetic tape for principal off-line storage, the allocation of special user files on tape or disk, and the reading and writing of user files on disk or tape. The final portion of the contract work included the evaluation and alteration of certain computer programs developed by the New York State Department of Transportation. USGRDR

N70-25916# Florida Univ., Gainesville. Dept. of Industrial and Systems Engineering.

COMPUTERIZED FACILITIES DESIGN: AN EVALUATION

Stephen D. Roberts Nov. 1969 25 p refs
(Contract DAHC04-68-C-0002; Proj. Themis)

(AD-700119; THEMIS-UF-TR-30) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-25548# System Development Corp., Santa Monica, Calif.
SYSTEMS MANAGEMENT APPLIED TO LARGE COMPUTER PROGRAMS IN BUIC III; REVIEW OF EXPERIENCE, JULY 1968 JUNE 1969

Lloyd V. Searle, Perry E. Rosove, and Eugene H. Sydow Jun. 1969 132 p refs

(Contract F19628-67-C-0026)

(AD-699585; ESD-TR-69-302) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-24065*# Miami Univ., Coral Gables, Fla. Center for Advanced International Studies.

NASA INFORMATION RESOURCES FOR THE FEEDBACK PROCESS

Dodd L. Harvey, and Karen M. Bartol 14 Nov. 1969 110 p refs

(Contract NSR-10-007-078)

(NASA-CR-109453) Avail: NTIS CSCL 05A

A means to permit ready access to the massive amount of inhouse data available at NASA headquarters, which is useful in explaining, understanding and evaluating the impact of NASA programs on the external environment is reported. The explanation is a mixture of reports, files, and collections of documents, and the format for the source description consists of: title, nature and purpose, and the office or individual to contact for additional information. Some source descriptions included are congressional reports, congressional responses, budget estimates, space age management, and financial high light reports. F.O.S.

N70-21469# Dartmouth Coll., Hanover, N.H. Mathematics Dept.
A NEW MANAGEMENT TOOL: CRITICAL PATH CHARTING APPLIED TO GRAPHICAL DISPLAY

John L. Anderson and Miles V. Hayes 2 Jun. 1969 88 p refs
(Contract F44620-68-C-0015)

(AD-697805; AFOSR-69-2988TR) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-21120*# Syracuse Univ., N.Y.

THE APOLLO PROJECT MANAGER: ANOMOLIES AND AMBIGUITIES

David L. Wilemon and John P. Cicero [1969] 21 p refs *Its Working Paper No. 18*

(Grant NGL-33-022-090)

(NASA-CR-109177) Avail: NTIS CSCL 05A

Some of the problems are dealt with that the Apollo project managers face in the everyday operation and implementation of the manned space effort. Emphasis is placed on the focal position of the project manager rather than on an overall systems concept of project management. Areas of ambiguity in terms of problem resolution and management strategies include: (1) maintaining the balance between technical and managerial emphasis, (2) risk acceptance/rejection, (3) surviving organizational systems, (4) the criticalness of project communication, and (5) penetrating the system. Discussion of these areas gives some preliminary insights into the management styles of the effective project manager and opens diverse areas for future research on the management of large scale, complex undertakings such as Apollo. Author

N70-21112*# Syracuse Univ., N.Y.

SYSTEMS ANALYSIS AND MANAGEMENT

Richard J. Hopeman [1969] 48 p refs *Its Working Paper No. 2*

(Grant NGL-33-022-090)

(NASA-CR-109198) Copyright. Avail: NTIS CSCL 05A

Concepts which may serve to link the NASA management experience with systems analysis and the potential application of that experience to industrial management are discussed. By structuring a conceptual scheme around the environment of industry, it is suggested that a useful frame of reference is provided for the detailed study of NASA management systems. The conceptual scheme developed may provide a basis for the evaluation of specific NASA management systems in terms of their contribution to more effective industrial management. Author

N70-20159# Joint Publications Research Service, Washington, D.C.

ON FORECASTING SYSTEMS

V. A. Lisichkin 2 Feb. 1970 58 p Transl. into ENGLISH of the book "O Prognoziruyushchikh Sistemakh" Moscow, 1969 p 1-60

(JPRS-49730) Avail: NTIS

Scientific-technical and social-economic forecasting systems are considered as instruments for the development of optimal strategy in the growth of science and technology in the face of increasing complexity of interrelationships of all branches of the national economy. Forecasting is assessed a rational tool for reduction of unplanned, game situations accompanying the process of scientific research and economic activity. The transition from individual predictions to complex forecasts of complicated objects includes the classical methods of linear forecasting, and finite mathematics. The effectiveness of scientific forecasting appears most fully in the development of systems for continuous forecasting. E.M.C.

N70-19989# Litton Systems, Inc., Van Nuys, Calif. Data Systems Div.

ADVANCED SYSTEM EFFECTIVENESS TECHNIQUES

Robert M. Stuckelman *In* AGARD Tech. for Data Handling in Tactical Systems Dec. 1969 p 291-298 refs

Avail: NTIS

This paper describes advanced techniques for defining and evaluating the effectiveness of command and control systems. The techniques to be described are applicable to most command/control/information processing systems. The system

effectiveness technique described herein is such an approach. Using it, a system is modeled with flow charts and performance is evaluated (via computer) based upon thousands of design parameters included in the model, using multiple input messages and various combinations of mission loading. Hardware, computer programs, communications, reliability, maintainability, personnel and logistic support factors are all taken into account in composite in predicting the system's performance in terms of reaction time for the various missions. Design decision impacts are evaluated by ascertaining the effects of differing parameters on the overall composite measure of performance. Confidence levels in composite system performance improve as the design progresses and as more test data becomes available to validate analytically determined parameters. Author

N70-17175# National Materials Advisory Board, Washington, D.C.
QUANTITATIVE TECHNIQUES FOR RESEARCH PROGRAM PLANNING IN STRUCTURAL MECHANICS Final Report, Jan. - Sep. 1969

Aug. 1969 71 p refs

(Contract N00014-67-A-0244)

(AD-696974; NMA8-259) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-16939# Mitre Corp., Bedford, Mass.
THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH

Paul L. Peck Jun. 1969 22 p refs

(Contract F19628-68-C-0365)

(AD-696675; MTP-333) Avail: NTIS CSCL 12/2

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-15534# Naval Postgraduate School, Monterey, Calif.
A MODEL OF A SYSTEMS ANALYSIS STUDY

Carl R. Jones 10 Jul. 1969 41 p

(AD-695427; NPS-55Js9017A) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-15495# Arizona State Univ., Tempe. Industrial Engineering Faculty.

FOUR GERT VIEWS OF PLANNING R AND D PROJECTS

A. Alan, B. Pritsker and Ronald A. Enlow 1969 27 p refs

(Contract NAS12-2035)

(NASA-CR-86279) Avail: NTIS CSCL 09B

Graphical evaluation and review technique (GERT) is explained in terms of its applicability in research and development planning processes. A network model is presented for planning R and D projects based on the philosophical or scientific method, idea generation or psychological method, administrative or business orientation, and engineering or technological viewpoints. Charts and graphical representations are given to explain the GERT network forms.

J.M.C.

N70-14482# National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

DATA MANAGEMENT AT THE NATIONAL SPACE SCIENCE DATA CENTER

James I. Vette and Nick Karlow Dec. 1969 12 p refs Presented at AIAA Earth Resources Observations and Inform. Systems Meeting, Annapolis, 2 4 Mar. 1970

(NASA-TM-X-63777; X-601-69-528) Avail: NTIS CSCL 09B

The primary function of the National Space Science Data Center (NSSDC) is to provide the means for the dissemination and

analysis of space science data beyond that provided by the original experimenter. The Center is, therefore, not an operational data processing center. However, the recognition of important secondary uses of data generated for operational needs is vital. Since the requirements placed on operational centers to accommodate this secondary function are minimal, the experiences of NSSDC in the secondary uses of space science data will be discussed. With a present satellite generation rate of one trillion bits per year of space science information, the data management problems become significant, and considerable data processing is required before maximum utilization of the data base can be realized. In addition, the Data Center must be concerned with an information system to handle documentation, performance data, instrument calibrations and characteristics, and management information. Author

N70-14409*# Arizona State Univ., Tempe. Engineering Research Center.

PLANNING R AND D PROJECTS USING GERT

Ronald A. Enlow and A. Alan B. Pritsker Jun. 1969 76 p refs

(Contract NAS12-2035)

(NASA-CR-86278) Avail: NTIS CSCL 09B

This study investigates the use of GERT in describing and analyzing the planning of research and development projects. Research and development programs are characterized by logical building blocks which are used to describe the underlying structure of the planning process. Five milestones are defined: problem definition, completion of the research activity, completion of the evaluation of proposed solutions, completion of a prototype, and implementation of the solution. The activities equivalent to these milestones are described as the fundamental processes of creative thought, time estimation, cost estimation and evaluation. Utilizing these descriptive tools, the R & D effort is analyzed with respect to the logical relationships between activities and the alternate paths by which the milestones may be realized. This information is then drawn in network form. A computer program is available to simulate the network and examples are presented. The ability of GERT to provide information on which the choice of alternate R & D structures can be based is indicated and the problem of projecting completion times, probability of success and man-hour requirements is considered. Author

N70-14290*# Arizona State Univ., Tempe. Engineering Research Center.

AN ANALYSIS OF A MANUFACTURING PROCESS USING THE GERT APPROACH

William J. Thompson, F. Stan Settles, and A. Alan B. Pritsker [1969] 30 p refs

(Contract NAS12-2035)

(NASA-CR-86289) Avail: NTIS CSCL 09B

The Graphical Evaluation and Review Technique (GERT) Approach was used to analyze a manufacturing process which was causing production problems. The analysis begins at the point where the problem is recognized and progresses to a solution by applying the steps of the GERT Approach. The network formulation and data collection steps of the GERT Approach were emphasized. A detailed description was given of how to convert a physical manufacturing process into a GERT network form. The form of the branch parameters were developed from written descriptions of the operations represented by each branch. The importance of the data collection phase of the analysis was stressed. As part of the review process, three alternatives were proposed and evaluated by means of an improvement analysis. In addition it was shown how to expand the basic model to include greater detail including the incorporation of costs as random variables. See N70-14291. Author

N70-13332# British Iron and Steel Research Association London (England). Operational Research Dept.

A NEW REPORT STYLE FOR COMMUNICATING TO INDUSTRY MANAGEMENT

C. J. Beattie 1969 6 p
(PB-186166; OR-44-67) Avail: NTIS CSCL05A

The report demonstrates the need for a new style of report for communicating to industry management, outlines the content and form of such a report, and mentions the probable consequences of using it. Author (USGRDR)

M5 PERSONNEL MANAGEMENT

N70-77737 American Inst. for Research, Pittsburgh, Pa. THE DEVELOPMENT OF A TEST FOR SELECTING RESEARCH PERSONNEL TECHNICAL APPENDICES

Jan. 1950 67 p
(N7ONR-370(00))
(AD-709445) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-77736 American Inst. for Research, Pittsburgh, Pa. THE DEVELOPMENT OF A TEST FOR SELECTING RESEARCH PERSONNEL

Mary H. Weislogel Jan. 1950 40 p refs
(N7ONR-370(00))
(AD-709444) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-77714 Federal Aviation Administration, Washington, D.C. STUDY OF MANAGEMENT PRACTICES AND MANPOWER UTILIZATION AT THE O'HARE AIR TRAFFIC CONTROL TOWER

Jun. 1968 94 p Prepared in cooperation with Bur. of the Budget and Civil Serv. Comm.
Avail: NTIS

Recommendations are discussed for solving management problems connected with air controller operations at O'Hare Airport. The recommendations, some of which are applicable at other ATC facilities, cover recruiting and training, the ATC operating environment, and controller career patterns. Study methods included interviewing, reviewing past studies, analyzing management data and ATC position recordings, and observing working conditions. Contacts were also made with other government agencies, representatives of the aviation industry, private organizations, FAA headquarters officials, and other authorities on manpower utilization, personnel psychology, and human factors aspects of ATC work.

E.C.

N70-77033 Psychological Research Associates, Inc., Arlington, Va.

METHODOLOGY USED IN THE DEVELOPMENT OF QUALITATIVE PERSONNEL REQUIREMENTS INFORMATION FOR THE TACTICAL AIR CONTROL SYSTEM (SYSTEM 314 L)

James F. Parker, Jr., Harold E. Price, and Peyton G. Walker Sep. 1958 34 p ref
(AF 41(657)-176)
(AD-707832; PRA-58-16; AFCRC-TN-58-70) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-76886 Air Force Systems Command, Wright-Patterson AFB, Ohio. Behavioral Sciences Lab.

HUMAN RESOURCES ENGINEERING: A NEW CHALLENGE

Gordon A. Eckstrand, William B. Askren, and Melvin T. Snyder Repr. from Human Factors, v. 9, no. 6, 1967 p 517-520
(AD-708115; AMRL-TR-67-167) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-75693 Stanford Research Inst., Menlo Park, Calif.

CRITERIA FOR THE DESIGN OF NEW FORMS OF ORGANIZATION Final Report, 1 Dec. 1966 - 28 Feb. 1970

Howard M. Vollmer and Joseph H. Mc Pherson 28 Feb. 1970 13 p refs
(Contract F44620-67-C-0039)
(AD-705702; AFOSR-70-0947TR) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-75691 Naval Personnel Research Activity, San Diego, Calif.

HUMAN FACTORS METHOD DEVELOPMENT AND TEST. 1: EVALUATION OF THE CORRECTIVE MAINTENANCE BURDEN PREDICTION PROCEDURE

Orvin A. Larson and Joe E. Willis Mar. 1970 40 p refs
(AD-704857; SRM-70-14) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-75295 Air Force Systems Command, Wright-Patterson AFB, Ohio. Behavioral Sciences Lab.

GROUP STRUCTURE, EFFECTIVENESS, AND INDIVIDUAL MORALE

Joseph Vannoy and Julian O. Morrisette Repr. from Organ. Behavior and Human Response, v. 4, no. 3, Aug. 1969 p 299-307 refs Prepared in cooperation with Miami Univ.
(Contract AF 33(657)-10456)
(AMRL-TR-66-207) Avail: Issuing Activity

By concomitantly varying effectiveness and centrality of communication structures this study attempted to: (1) discover the relationship of effectiveness to satisfaction; (2) determine the relative contributions of both centrality and effectiveness to satisfaction with job and group; and (3) determine the relationship between job satisfaction and satisfaction with the group's performance. The results suggest that satisfaction with job and group, not necessarily concurrent states, may be mediated by different conditions, namely centrality and effectiveness. Performance effectiveness feedback does affect satisfaction with group but it has very little effect on job satisfaction. The latter appears to be mediated largely by centrality. The separateness of the effects of centrality and group effectiveness was further supported by data indicating scapegoating. Just as job satisfaction appears to be insulated from the effects of performance effectiveness so do feelings of responsibility for the group's performance. When groups did poorly individual members attributed this not to themselves but to others in the group including the leader. Author

N70-71225 Office of the Secretary of Defense (Research and Engineering), Washington, D.C.

SURVEY OF COMPENSATION OF DOD CIVILIAN SCIENTISTS AND ENGINEERS ENGAGED IN RESEARCH AND DEVELOPMENT

E. M. Glass 15 Jul. 1969 290 p refs
(AD-696084; MAR-69-2) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-42150# Naval Missile Center, Point Mugu, Calif. Target Dept.

MANAGEMENT PREPARES FOR COLLECTIVE BARGAINING AT THE NAVAL MISSILE CENTER

T. C. Lockhart 20 Jul. 1970 128 p refs
(AD-709417; NMC-TP-70-46) Avail: NTIS CSCL 5/9

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries

N70-41463# Joint Publications Research Service, Washington, D.C.

INTELLECT, COGNITION, AND TECHNOLOGY

Yevgeniy Semenovitch 15 Sep. 1970 48 p Transl. into ENGLISH of the booklet 'Intellect, Poznaniye, Tekhnika' Moscow, Znaniye, 1970

(JPRS-51372) Avail: NTIS

The heuristic quality, creativity, mobility, and prediction ability of an individual's intellect are discussed as well as his reasoning power, independence of reflection, intellectual openness, self-reflection, inclinations, dissatisfaction, and optimism. The dread of newness and conformism is also mentioned. The principles of compatibility, correspondence, permanentness, and scientific equality and superiority are included under collective intellect along with the right to make mistakes, criticism, and the principles of encouragement, permanentness of the research cycle, and minimal control.

J.M.

N70-41006# Federal Aviation Administration, Washington, D.C.
DEVELOPING MANPOWER REQUIREMENTS IN NONSTANDARD ENVIRONMENTS WITH RANDOM WORKLOAD DEMANDS

Peter N. Kovalick [1970] 28 p refs Presented at the 21st Ann. Conf. of the Am. Inst. of Ind. Engr., Cleveland, May 1970
Avail: NTIS

The concept of developing manpower requirements in nonstandard environments with random workload demands is presented through an application in air traffic control towers. It is based on developing standard data by a microanalysis of air traffic operations. The standard data can then be used to formulate customized standards for various combinations of work situation variables. Humanistic effects resulting from variations in workload stress and complexity are considered in relation to requirements for handling 100% of random peak traffic volumes. Both the static and dynamic characteristics and constraints of the system are treated.

Author

N70-35458# Rochester Univ., N.Y. Management Research Center.

TRANSNATIONAL STUDY OF MANAGEMENT Final Report to the Ford Foundation, Sep. 1966 Sep. 1969

Bernard M. Bass and Karamathu M. Thiagarajan Dec. 1969 38 p refs Sponsored in part by the Ford Found
(AD-700287) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-34360*# National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

THE LIFETIME EARNINGS OF ENGINEERS AND SCIENTISTS

John C. Evvard [1970] 20 p refs
(NASA-TM-X-52868; E-3853) Avail: NTIS CSCL 05C

Results are given of a statistical analysis of salary versus experience data for engineers and scientists with emphasis on the federal employee salary system. The federal retirement benefit plan is compared with a private investment plan using a 6 1/2 percent

salary deduction factor. Tables and graphs include data on lifetime earnings showing tax deductions, retirement take-home pay, and salary versus experience curves.

E.C.

N70-32880*# New Mexico Univ., Albuquerque. Dept. of Public Administration.

PERSONNEL PERFORMANCE EVALUATION IN RESEARCH AND DEVELOPMENT ACTIVITIES: MOTIVATION THROUGH THE JOB

Richard Eugene Uhrmann (M.A. Thesis) Jun. 1970 169 p refs
(Grant NGL-32-004-042)

(NASA-CR-109824) Avail: NTIS CSCL 05A

Personnel performance evaluation structured as an integrated part of a management process of work assignment and review which involves participation by the employee is studied as a useful vehicle for employee motivation through the job in government research and development activities. It is concluded that the proposition of is conditionally supported from a conceptual standpoint. Some of the conditions found essential to the workability of are: management philosophy and behavior conducive to a reasonable degree of employee participation in decision in matters relating to his job; challenging work; individual need structures in which the noneconomic motivators are largely prepotent; and supervisors skilled in work planning and organization and human relations. This conclusion is further conditioned by the need for more experimental research on the man-job relationship. An extended period of staff and supervisory training is anticipated to implement the approach.

Author

N70-32879*# New Mexico Univ., Albuquerque. Dept. of Public Administration.

THE PERSONNEL ASSIGNMENT PROBLEM: A SPECIFIC APPLICATION TO THE ASSIGNMENT OF SCIENTIFIC AND ENGINEERING OFFICERS IN THE UNITED STATES AIR FORCE

James A. Bickel (M.A. Thesis) Jun. 1970 111 p refs
(Grant NGL-32-004-042)

(NASA-CR-109823) Avail: NTIS CSCL 05A

This study considers the assignment problem in general, with a specific application directed at the assignment of scientific and engineering officers in the United States Air Force. By selecting such a specific group, the methodology by which personnel can be optimally assigned was developed. In applying this approach to a specific group, this study addresses four major problem areas which include: (1) the acquisition and quantification of data which describe both the characteristics of the position and the qualifications and preferences of the persons being assigned; (2) the development of a normative mathematical model which calculates the predicted effectiveness of each individual in the positions available; (3) a mathematical technique which, based on the predicted effectiveness ratings, can optimally allocate these individuals to the available positions within the computer time-and-memory constraints; and (4) verification of the model.

Author

N70-32877*# New Mexico Univ., Albuquerque. Dept. of Public Administration.

MANAGEMENT DEVELOPMENT OF SCIENTISTS AND ENGINEERS IN THE FEDERAL GOVERNMENT: AN ANALYSIS OF BASIC BEHAVIORAL AND SYSTEMS CONSIDERATIONS

Vladimir V. Berniklau (M.A. Thesis) Jun. 1970 127 p refs
(Grant NGL-32-004-042)

(NASA-CR-109820) Avail: NTIS CSCL 05A

Management development, as a multitude of alternative programs is presented. Prior to examining solutions, the problem must be defined and basic considerations evaluated. The considerations deemed most important are behavioral and systems considerations. Specifically, the transformation from scientist or engineer to

competent manager within the federal government is analyzed. A major conclusion is that management development can be a mechanism for mutual satisfaction of organizational and individual needs under certain conditions. These conditions are shown to include a psychologically healthy organization and the use of Theory Y assumptions by top management. An additional conclusion is that a management development program based on a systems approach can serve to smooth the transition from scientist or engineer to manager. Author

N70-32555# Technical Communications Corp., Los Angeles, Calif.
TOP-MAN X: A MANAGEMENT SIMULATION FOR INSTRUCTION IN TOTAL PROGRAMMING AND THE BASE ENGINEER AUTOMATED MANAGEMENT SYSTEM (BEAMS) Final Report, Sep. 1967 - Sep. 1969

Joel M. Kibbee, Leon Vickman, Ellen M. Dent, Luis F. Dominguez (AFSC, Wright-Patterson AFB, Ohio), and Arthur T. Stellmach (AFSC, Wright-Patterson AFB, Ohio) Wright-Patterson AFB, Ohio
AFSC 26 Sep. 1969 62 p refs
(Contract F33615-68-C-1076)
(AD-704892; SFN-2643; AFHRL-TR-69-20) Avail: NTIS CSCL 5/9

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-14997# Michigan Univ., Ann Arbor. Inst. for Social Research.

THE CONDITIONING EFFECTS OF TECHNOLOGY ON ORGANIZATIONAL BEHAVIOR IN PLANNED SOCIAL CHANGE

James C. Taylor 30 Sep. 1969 109 p refs
(Contract N00014-67-A-0181)
(AD-694995) Avail: NTIS CSCL 5/11

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-14845*# Syracuse Univ., N.Y. Graduate School.
THE PROFESSIONAL AND TECHNICAL QUALIFICATIONS OF APOLLO PROJECT MANAGERS

John Phillip Cicero Aug. 1969 151 p refs
(GRANT NGL-33-022-090)
(NASA-CR-107458) Avail: NTIS CSCL 05A

Some specific criteria which can be identified with project manager as a professional career are formulated. The demographic characteristics of a sample of Apollo project managers are compiled and evaluated in terms of their professional and technical qualifications. Final analysis of the data revealed the following characteristics as predominant project manager career specifications or prerequisites. Author

M6 TECHNOLOGICAL RESOURCES

N70-76470 National Commission on Technology, Automation, and Economic Progress.

TECHNOLOGY AND THE AMERICAN ECONOMY, VOLUME 1

Feb. 1966 128 p refs
Avail: SOD

Commission findings are documented under the following headings: the pace of technological change, technological change and unemployment, creating an environment for and facilitating adjustment to change, applying technology to community needs, technology and the work environment, and improving public deci-

sion making. Commission responsibilities included assessing (1) the past effects and the current and prospective role and pace of technological change; (2) the impact of technological and economic change on production and employment during the next ten years; (3) those areas of unmet community and human needs toward which application of new technologies might most effectively be directed; (4) those actions which should be taken by the Federal, State, and local governments to support and promote technological change for economic growth and improved well-being, and measures which facilitate occupational adjustment and geographical mobility. E.C.

N70-70689 Department of Housing and Urban Development, Washington, D.C.

FUTURE TECHNOLOGY FOR URBAN SYSTEMS

John P. Eberhard Mar. 1968 91 p refs
(PB-185205; Rept-7) Avail: NTIS

Contents: Hardware and software systems; The generation of invention and innovation; Factors affecting the advancement of urban technological processes; The institutional framework or rule system; The development of new professionals; The adaptive urban system. USGRDR

N70-70578 Department of Housing and Urban Development, Washington, D.C.

TECHNOLOGY IN THE CITY

Aaron Fleisher 1968 25 p refs Prepared in cooperation with Massachusetts Inst. of Tech.
(PB-185204; Rept-70) Avail: NTIS

The report discusses the dislocations and changes in cities that are ascribable to past and current technological developments, the urban problems whose solutions may have an appreciable technological component, and the opportunities for improving cities by means of application of available or developable technology. USGRDR

N70-42711*# National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

A BY-PRODUCT OF NASA: TRANSFER OF NEW TECHNOLOGY TO VARIOUS SECTORS OF THE ECONOMY

Charles Henry Whitlock, III (M.A. Thesis - Coll. of William and Mary) Apr. 1970 110 p refs
(NASA-TM-X-66393) Avail: NTIS CSCL 05B

The various processes of technology transfer currently being utilized by NASA are considered to extract knowledge concerning the technology transfer process and to describe areas where additional effort is required. Methods of technology transfer for both formal technical publications and other informal publications are examined. Services available to both the aerospace industry and the civilian economy are reviewed. Shop- or production-oriented innovations as well as new scientific technology are considered. Patent opportunities in terms of licenses and waivers available to the civilian economy are also examined. Results indicate that the system of publications, computerized storage and search services, and other processes for transferring technology to both the aerospace industry and civilian industry are highly successful in spite of its complexity and relative newness. NASA patent and licensing policy appears flexible and well geared for effective technology transfer. Author

N70-38647# Congress. House. Committee on Science and Astronautics.

A TECHNOLOGY ASSESSMENT SYSTEM FOR THE

EXECUTIVE BRANCH Report of the National Academy of Public Administration

Washington GPO Jul. 1970 93 p refs Prepared by the Natl. Acad. of Public Admin. for the Subcomm. on Sci., Res., and Develop.
 Avail: SOD

Recommendations are presented for procedures to be followed by the Executive branch of government in technology assessment. The investigation was made with respect to public administration and possible application to organizational and administrative formats in the Executive branch.
 R.B.

N70-34546# Federation of Rocky Mountain States, Inc., Denver, Colo.

SCIENCE AND TECHNOLOGY AND ITS APPLICATION TO THE PROBLEMS OF POLLUTION, TRANSPORTATION AND EMPLOYMENT. PUBLIC SCIENCE POLICY: BACKGROUND READINGS

Donald W. Galvin and Nick Jannakos 1970 144 p refs Presented at the Western Governors Conf., Salt Lake City, 9-11 Mar. 1970 Sponsored in part by NSF
 (PB-190500) Avail: NTIS CSCL05A

The document covers what government leaders and the science and technology community must do to set up the mechanism and lines of communication required to bring technology to bear on current public problems. It identifies potential applications of new technology to social problems in the areas of pollution, transportation, employment and future planning. It contains recommendations for federal, regional, interstate, state and local action in order to fully utilize science and technological resources, overcoming problems in federal state relations, inter-agency relations, communication, financing, and manpower.

Author (USGRDR)

N70-28591# Congress. Senate. Committee on Aeronautical and Space Sciences.

SPACE PROGRAM BENEFITS

Washington GPO 1970 383 p refs Hearing before the Comm. on Aeron. and Space Sci., 91st Congr., 2d Sess., 6 Apr. 1970
 Avail: Comm. on Aeron. and Space Sci.

Testimony centered on the broad impact space is having, and will continue to have, on our society, our technology, our industrial economy, and our planetary environment. The direct benefits to science, to meteorology, to communications, and to management are discussed, along with the new processes whereby NASA is more effectively transferring technical information and getting it used throughout the socioeconomic system. Details are given on the NASA Technology Utilization Program and the distribution of scientific and technical publications; the impact of the space program on education; NASA's contributions to university research facilities; news media coverage and public interest in the space program; and NASA's reliability and quality assurance program.
 M.G.J.

N70-27867# Office of Research Analyses, Holloman AFB, N.Mex.
ON THE DIFFUSION OF INNOVATIONS RESEARCH TRADITION Final Report

Gustavo M. Quesada Nov. 1969 48 p refs
 (AD-701001; ORA-69-0016) Avail: NTIS CSCL5/10

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-26454*# George Washington Univ., Washington, D.C. Program of Policy Studies in Science and Technology.

SOME LEGAL JURISDICTIONAL, AND OPERATIONAL IMPLICATIONS OF A CONGRESSIONAL TECHNOLOGY ASSESSMENT COMPONENT

Louis H. Mayo 2 Dec. 1969 57 p refs Presented before the

House. Comm. on Sci. and Astronaut, Washington, D.C., 2 Dec. 1969 Its Staff Discussion Paper 207

(Grant NGL-09-010-030)

(NASA-CR-109547) Avail: NTIS CSCL05A

The application of technological resources to national social needs is a matter which should be viewed in the broadest perspective. Technology assessment is a part of this general process. Technology in all its ramifications is a major national resource. At a critical decision point concerning the allocation of national resources to social needs, this task should not be relegated solely to the partisan political process, however important the political/adversarial system is considered. Some of the most promising of our technological resources are new concepts and techniques of information management and systematic decision making. The advantages in systems and cybernetics approaches are discussed. Techniques of automatic data processing, operations research, and simulation are reviewed for relevant knowledge to bear on intricate policy decisions. Converting the notion of technology assessment to an operational system provides an unparalleled opportunity to apply these technological skills. In sum, the initiation of a more systematic and comprehensive technology assessment function presents not only an opportunity to usefully apply new technological skills but in so doing should encourage a broadened spectrum of public participation.
 Author

N70-26358*# California Univ., Berkeley. Space Sciences Lab.
INFORMATION SYSTEMS AND PUBLIC PLANNING

Ida R. Hoos Jan. 1970 30 p refs /Its Working Paper No. 112
 (Grant NGL-05-003-012)

(NASA-CR-109511) Avail: NTIS CSCL05B

Information systems capabilities are critically assessed. It is concluded that in community planning, information systems, as designed and mechanized at present, provide a shaky foundation for the information vital to public planners. More and faster-moving information to improve the efficiency of government operations is basic, but difficult to implement. Greater efficiency, is often accompanied by very high social costs. Knowledge of the subject matter, not merely know-how in the selection, aggregation, and manipulation of data is held vital in information systems design. The human and social values of the society which defy technical handling are cited as important considerations in planning for the future. These include: economic balances of power, the sources of pressure, the political and jurisdictional realities, and the likelihood of rapid change and swift reaction as communities become more alert to their rights and responsibilities.
 E.M.C.

N70-26354# Congress. House. Committee on Science and Astronautics.

SCIENCE AND TECHNOLOGY AND THE CITIES PANEL MEETING PAPERS

Washington GPO 1969 135 p refs Presented by the Comm. on Sci. and Astronaut. at the 10th Meeting of the Panel on Sci. and Technol., 1969

Avail: SOD

Papers presented during this conference reflect modern thinking on the future patterns of human settlement. The massing of people and resources in one place creates a variety of problems in communications, transportation, and the arts of organization. Overriding are aspects of funding and population explosion, both of which probably require sooner or later governmental regulation.
 G.G.

N70-26339*# Denver Research Inst., Colo.

THE ENVIRONMENT AND THE ACTION IN TECHNOLOGY TRANSFER, 1970 1980

[1969] 49 p Conf. held at Snowmass-at-Aspen, Colo., 26-28 Sep. 1969

(Contract NSR-06-004-063)

(NASA-CR-109656) Avail: NTIS CSCL05B

The Aspen conference involved two and a half days of in-session discussion of technology transfer. After an introductory paper, the remaining sessions were structured around different functional interests: the source, the user, the researcher. Attention then was concentrated on what the conferees generally agreed was the most significant target for the technological transfusion: the urban scene. Author

N70-25836*# Denver Research Inst., Colo. Industrial Economics Div.

PROJECT FOR THE ANALYSIS OF TECHNOLOGY TRANSFER Annual Report, 1969

Dean C. Coddington, Paul I. Bortz, and James E. Freeman Mar. 1970 53 p refs

(Contract NSR-06-004-063)

(NASA-CR-109516) Avail: NTIS CSCL05B

Project for the Analysis of Technology Transfer results fall into three categories: (1) general findings indicate a tendency for many private corporations to minimize and/or to be unaware of the technological benefits received from federal agencies; and that the impacts of technology transfers from NASA's Tech Brief-Technical Support Package (TSP) program are a small proportion of the total impacts of transfers resulting from all of NASA's activities; (2) effectiveness of the TSP program was demonstrated by the general awareness, in a tangible way, that new and useful by-product technology is being generated by large federal research and development programs; (3) special studies of other technology utilization activities proved, by a user's evaluation, that a NASA Regional Dissemination Center is substantially valuable; an examination of the NASA Biomedical Application Team program led to the selection of an internal consultant, a major factor in the success of the effort; and a study of users of Gemini and Apollo photography showed customers to be primarily university level academicians, who rated the photography quality to be high. E.M.C.

N70-25218*# Pittsburgh Univ., Pa. Graduate School of Public and International Affairs.

THE UNIVERSITY-RELATED SCIENCE INSTITUTE AS A TECHNOLOGY TRANSFER AGENCY

William D. Brinckloe and William F. Matlack [1969] 23 p Presented at the 10th Ann. Meeting of the Inst. of Management Sci., Atlanta, 3 Oct. 1969

(Grant NGL-39-011-080)

(NASA-CR-109554) Avail: NTIS CSCL05B

The organizational problems, advantages, and disadvantages of such university-affiliated institutions are explored. The science center provides services on a contract basis to government and industrial users. Author

N70-23793*# National Academy of Sciences-National Research Council, Washington, D.C.

TECHNOLOGY: PROCESSES OF ASSESSMENT AND CHOICE

Jul. 1969 174 p refs

Avail: SOD

Technology assessment problems are examined primarily in terms of technological trends themselves and secondarily on the individual effects of such trends on society and the environment. Critical deficiencies in assessment and decision making processes are identified with the aim of ensuring that technology development will reflect greater sensitivity to the total systems effect on the human environment. The creation of a federal agency is proposed to coordinate private and public technology assessment systems and act as an institutional basis for expediting further research in this area. E.M.C.

N70-21122*# Syracuse Univ., N.Y.

TECHNOLOGICAL DATA TRANSFER WITHIN THE MORRIS MACHINE WORKS COMPANY

E. Lawson May 1969 19 p /ts Working Paper No. 5

(Grant NGL-33-022-090)

(NASA-CR-109190) Avail: NTIS CSCL05A

Methods are discussed for dissemination of technological information from the ideal stage to commercial application within a machine works company. Technological information received from both external and internal sources is discussed at a general staff meeting, depending on its relevance and importance to operations. If not sufficiently important for a staff meeting, the information is handled within the department concerned. All information thought to be important to either present or future operations of the company is filed in a central information storage area under the proper heading. R.B.

N70-21113*# Syracuse Univ., N.Y.

TECHNOLOGICAL DATA TRANSFER WITHIN THE O. M. EDWARDS COMPANY

E. Lawson [1969] 20 p /ts Working Paper No. 6

(Grant NGL-33-022-090)

(NASA-CR-109186) Avail: NTIS CSCL05A

Processes of technological data acquisition, evaluation, and exploitation within a small metal fabrication plant were assessed. Interviews were held with company officials and supervisory personnel, and internal and external sources of technological data were identified. Sources include customers, suppliers, trade magazines, visits to other plants, and intercommunication within the plant. Results point up the need for improvements in the plant information system, particularly with regard to encouraging the flow of innovative ideas and increasing two-way communication between top management and line personnel. E.C.

N70-21108*# Syracuse Univ., N.Y.

THE PROCESS OF TECHNOLOGY TRANSFER IN THE LARGE FIRM

Peter G. Franck May 1969 39 p refs /ts Occasional Paper No. 2

(Grant NGL-33-022-090)

(NASA-CR-109194) Avail: NTIS CSCL05A

The conscious process by which technical knowledge is made available to and applied by people and organizations other than those who generate it is discussed. The horizontal and vertical transfer processes are described in relation to the decision making process at the firm level. Research results were divided into categories accordingly: nonmission research, mission oriented research, and development and application. J.M.C.

N70-15676*# North Carolina Science and Technology Research Center, Raleigh.

REGIONAL TECHNOLOGY TRANSFER PROGRAM Final Report, 1 Jun. 1968-31 Aug. 1969

31 Aug. 1969 118 p refs

(Contract NSR-34-007-006)

(NASA-CR-107625) Avail: NTIS CSCL05B

Three factors set the North Carolina Science and Technology Research Center apart from other Regional Dissemination Centers: its orientation with state government (rather than a university), the predominantly agrarian economy of the vast area it serves, and its emphasis on the development of more sophisticated software for computerized information retrieval. Each of these factors has influenced the growth and effectiveness of the Center, and its impact, through the Technology Utilization Program, on industry in the Southeast. Through the graduate student program, the center has pioneered in providing low cost literature searches in technical and scientific fields to advanced degree candidates in 23 southern universities. This support strengthens the university's graduate program and funnels new technology into industry through the scientists and leaders of tomorrow. Several Science and Technology

Research Center case histories are related to illustrate the effectiveness of a technology utilization program in this particular geographic area. Author

N70-11582* Indiana Univ. Foundation, Bloomington. Aerospace Research Applications Center.

AN INVESTIGATION INTO THE INFORMATION HABITS OF SCIENTISTS AND ENGINEERS IN INDUSTRY

Robert W. Hall (Tenn. Univ.) Oct. 1969 16 p refs
(Grant NSR-15-003-076)

(NASA-CR-106832) Avail: NTIS CSCL 05A

Three different types of individuals in industrial research and development work were compared with a control group on the basis of their information habits and a few related personal characteristics to uncover ways of increasing and improving usage of information center services. The groups consisted of (1) top performers, (2) technological gatekeepers or informal consultants, and (3) ARAC information system users. The control group was chosen at random. The results are given in tabular form on performance characteristics, technical information source preferences, time spent reading six different types of literature, and comparative usage of different information sources. J.A.M.

M7 MANAGEMENT POLICY & PHILOSOPHY

N70-77748* Syracuse Univ., N.Y.

PROJECT AUTHORITY: A MULTIDIMENSIONAL VIEW

John P. Cicero and David L. Wilemon Jul. 1969 19 p refs
Submitted for publication

(NGL-33-022-090)

(NASA-CR-110829; Rept-1) Avail: NTIS

Some basic authority relationships are discussed within five models of project management: (1) the individual model, (2) the staff model, (3) the intermix model, (4) the aggregate model, and (5) the NASA Apollo model. The authority construction is broken down into formal authority (authority inherent with the position and organizationally derived) and functional authority (authority generated by the individual through his own competence and human administrative skills). How the bases and functions of authority tend to shift within the various models of project management is shown. An examination of the project manager's use of restrictive authority and influence in varying project contexts eliminates some of the ambiguity surrounding the concept of project authority by clearly presenting the alternatives open to the project manager. Author

N70-76486 Rochester Univ., N.Y. Management Research Center.

MIDDLE MANAGERS, EXPECTATIONS OF THE FUTURE WORLD OF WORK: IMPLICATIONS FOR MANAGEMENT DEVELOPMENT

John A. Haas Feb. 1969 203 p refs
(N00014-67-A; 0398-0002)

(AD-706105; TR-26) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-76381* Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

PROGRAM OF RESEARCH ON THE MANAGEMENT OF RESEARCH AND DEVELOPMENT. SOME FACTORS

ASSOCIATED WITH THE EVALUATION OF IDEAS FOR PRODUCTION CHANGES IN SMALL COMPANIES

Robert Burton Martin (Ph.D. Thesis) Aug. 1967 63 p refs
(NsG-495)

(NASA-CR-113538; Rept-67/29) Avail: NTIS

Research into some of the factors which influence the rate of technological change in industry is reported. The research is an attempt to explore the relevance of certain organizational and individual factors to the acceptance of ideas for changes in the firm's production process. This exploration was carried out by measuring the evaluation of actual ideas in the organizational setting and relating the number of ideas evaluated and the number accepted to the organizational and individual factors hypothesized to be relevant. Data were gathered from 86 cooperating managers and engineers in 34 firms engaged in electronics manufacturing. Each manager and engineer was asked to keep a record of all ideas for changes in the firm's production process, which he evaluated, for six weeks. At the end of the six week period, each evaluator filled out a questionnaire which served to measure certain organizational and individual variables of interest. Data were gathered on 391 idea evaluations, and were analyzed by computer using a binary multiple regression model. Author

N70-74986 Joint Publications Research Service, Washington, D.C.

LENINIST PRINCIPLES OF MANAGEMENT IN THE AGE OF SCIENTIFIC AND TECHNICAL REVOLUTION

G. S. Pospelov 12 Jun. 1970 12 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR - Tekhnicheskaya Kibernetika (Moscow), no. 2, 1970 p 3-8

(JPRS-50725) Avail: NTIS

Automated control of the national economy is discussed. Systems methodology is compared for process controls and administrative or organizational controls in terms of operations research and systems analysis techniques. E.C.

N70-74974 Joint Publications Research Service, Washington, D.C.

MANAGEMENT SYSTEMS NEED TO BE IMPROVED

A. Tokarev 11 Jun. 1970 15 p Transl. into ENGLISH from Russian report

(JPRS-50717) Avail: NTIS

The status is reviewed of a centralized management control system for the industrial construction sector. The system uses computerized information centers as part of an automated system based on economic analyses and mathematical models. E.C.

N70-38714* Syracuse Univ., N.Y.

RELATIONSHIPS BETWEEN RESEARCH AND DEVELOPMENT OPERATIONS AND INDUSTRIAL OPERATIONS AT MSFC

Bernard D. Wood Presented at an Interdisciplinary Seminar, Syracuse, N.Y., 16 Apr. 1969 Its Working Paper No. 19
(Grant NGL-33-022-090)

(NASA-CR-109153) Avail: NTIS CSCL 05A

An attempt is made to explain the complex relationships, both formal and informal, between the two directorates at the MSFC as they existed prior to the reorganization of February, 1969. Through a detailed expansion of selected sections of the official organization chart, a typical interaction between a sub-system manager in IO and a particular section of one laboratory in R and DO was examined. The formal channels, the management matrices, and the modes of informal contact were reviewed from results of numerous interviews. The change board and the management levels throughout the Apollo program were also examined. Author

N70-37216# Department of Labor, Washington, D.C. Bureau of Labor Standards.

THE FUNDAMENTALS OF ACCIDENT PREVENTION

1969 17 p refs Revised *Its* Bull. No. 247

Avail: SOD

Basic elements in industrial safety programs are outlined. Establishment of policy, delegation of authority, and assessing the progress made are discussed under management leadership. The layout of the workplace, working surfaces, tools and equipment, machine safeguarding, and materials-handling facilities are cited, as well as flammable materials, housekeeping, health hazards, and maintenance. The need for proper training and supervision is stressed. Methods for maintaining employee participation and interest in the safety committees and activities are mentioned. J.M.

N70-36513# Office of Aerospace Research, Arlington, Va.
COUPLING OF SCIENCE TO TECHNOLOGICAL DEVELOPMENT (REVIEW OF CONCEPTS AND LESSONS ABOUT RESEARCH AND DEVELOPMENT COUPLING: THE IMPLICATIONS FOR RESEARCH AND DEVELOPMENT POLICIES)

Alexander G. Hoshovsky and Ernest P. Luke Oct. 1969 17 p refs

(AD-704569; OAR-69-0022) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-36102# Joint Publications Research Service, Washington, D.C.

DECISION-MAKING IN OPERATIONS RESEARCH

G. Pospelov 11 Aug. 1970 16 p refs Transl. into ENGLISH from *Nauki i Zhizn* (Moscow), no. 6, 1970 p 2-9

(JPRS-51140) Avail: NTIS

The factors involved in making decisions for control of operations are discussed. The basic factor in any control consists of the decisions and the processes leading to adoption of decisions. Control of operations is accomplished by decisions being made by the control agency on the basis of all information flowing into the controlled object, including information coming through the feedback channel. Examples of procedures used in decision-making are given. R.B.

N70-34841# System Development Corp., Santa Monica, Calif.
PLANNING BY MAN-MACHINE SYNERGISM: A CHARACTERIZATION OF PROCESSES AND ENVIRONMENT

Aiko M. Hormann 31 Mar. 1970 92 p refs

(Contracts DAHC15-67-C-0149; Nonr-4745(00))

(AD-704810; SDC-SP-3484/000/00) Avail: NTIS CSCL 5/8

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-34777# Joint Publications Research Service, Washington, D.C.

ROLE OR TO OF MANAGEMENT AND CONTROL SYSTEMS

Yu. A. Tikhomirov 22 Jul. 1970 16 p refs Transl. into ENGLISH from *Sov. Gos. i Pravo* (Moscow), no. 5, May 1970 p 62-71

(JPRS-51005) Avail: NTIS

The nature and relationship of control systems is discussed in terms of political organizations of society. The objects of control participate in the various activities of the subjects of control and effect public opinion, the press, television, radio, and other communications media. Each controlling system developed for

modern social environments facilitates the modeling of individual management levels in order to implement changes in national economy, scientific and technical progress, and economic reform.

G.G.

N70-24092*# Syracuse Univ., N.Y.

MULTIDISCIPLINARY STUDIES IN MANAGEMENT AND DEVELOPMENT PROGRAMS IN THE PUBLIC SECTOR
Semiannual Report, 1 Jul. 31 Dec. 1969

Martin E. Barzelay Mar. 1970 40 p refs

(Grant NGL-33-022-090)

(NASA-CR-109454; SAR-4) Avail: NTIS CSCL 05A

Continuing research activities on project management, business relations, decision making, multidisciplinary research, and related topics are reported, and abstracted data from reports are given. Efforts on the role of the project manager are centered on correlating information and insights, and conferences and trips for the purpose of establishing research models and conclusions are summarized. Dissemination of new technology in institutions, large manufacturing firms, and nuclear power plants is discussed. Additional research is outlined on space regulations; partitioning NASA contracts; NASA and multidisciplinary research in universities; public administration, the universities, and NASA; the accuracy of cost estimation for Apollo decision making; and the international tracking system. N.E.N.

N70-23324*# George Washington Univ., Washington, D.C.

THE APOLLO DECISION AND ITS LESSONS FOR POLICY-MAKERS

John M. Logsdon (Catholic Univ.) Jan. 1970 39 p refs *Its* Occasional Paper No. 7

(Grant NGL-09-010-030)

(NASA-CR-109284) Avail: NTIS CSCL 05H

Political processes leading to the U.S. decision to place men on the moon are discussed. An analysis is made of the far-reaching effects of this decision on future governmental efforts to deal with external and domestic challenges. The feasibility of employing the successful techniques of organizing and directing energy used in Project Apollo for other worthwhile societal objectives is evaluated. D.L.G.

N70-21124*# Syracuse Univ., N.Y.

A CONCEPT OF PROJECT AUTHORITY IN THE NASA/APOLLO PROGRAMMATIC ENVIRONMENT

John P. Cicero and David L. Wilemon 16 Jun. 1969 42 p refs *Its* Working Paper No. 7

(Grant NGL-33-022-090)

(NASA-CR-109192) Avail: NTIS CSCL 05A

Divergent concepts and theories centering around project authority are discussed. The distinctions between traditional management and project management are delineated. A concept of project authority is given basing a man's authority on his professional reputation gained through recognition of his accomplishments. Evidence is presented in an attempt to substantiate this concept by reducing the universe to a particular organization, NASA, and particularly within the Apollo program. The evidence is an indicator that an influence oriented authority structure is an appropriate method of analysis and evaluation of project authority. The interrelationships tend to be a function of the project work flow, leaving the degree of effectiveness of those relationships to the managerial capabilities of the managers operating at the nucleus of the system. Authority becomes coupled with leadership and influence generated through knowledge and respect. An attempt is made to show that the formal authority construct as depicted by the organization charts, job description, and policy statements, presents only a partial picture of project authority. Author

N70-21121*# Syracuse Univ., N.Y. School of Business Administration.

THE SPECTRUM OF PROJECT MANAGEMENT

John P. Cicero Dec. 1968 13 p refs /Its Working Paper No. 3

(Grant NGL-33-022-090)

(NASA-CR-109178) Avail: NTIS CSCL05A

Project management theory is discussed with respect to traditional theory on the basis of differentiating characteristics. The effect of the project structure on the existing organization and the roles of project management and managers are considered. The behavioral elements affecting project management at both the organizational and managerial level are discussed. Recommendations are given for analysis of other behavioral factors involving groups and individuals within project systems and of those involving the project system and the functional and outer-organizational sectors affecting any given project. R.B.

N70-21117*# Syracuse Univ., N.Y.

IMPACT OF OF BUDGET EXECUTION ON MANAGEMENT BEHAVIOR: A STUDY OF MANAGERIAL PERCEPTION

Harry J. Lasher Dec. 1968 117 p refs

(Grant NGL-33-022-090)

(NASA-CR-109185; IR-1) Copyright. Avail: NTIS CSCL05A

The budget is discussed as a point of focus for studying the effects of pressures on managers and the strategies developed by them to adapt and cope with these stresses in a dynamic organization. The effects of budgets and the managerial strategies are divided into the intended consequences and the unintended consequences. A systems approach to viewing the organization and its members is considered, using budget implementation process, and the eventual development of an operational, predictive mode. Economic, traditional, and behavioral approaches to goals and objectives are described, along with environmental dynamics and considerations affecting discretion. A new approach to the concept of organizations is suggested as a basis for the analysis of dynamic variables in current business environment. Organizational and operational concepts are identified. Details are given on the administration of managerial controls, emphasizing the manager as the human element. Definitions, utilization, control and execution of budgets, are discussed, and a research approach applicable to NASA is presented. N.E.N.

N70-21111*# Syracuse Univ., N.Y.

A CONCEPT OF PROJECT AUTHORITY

John P. Cicero [1969] 24 p refs /Its Working Paper No. 6 (Grant NGL-33-022-090)

(NASA-CR-109197) Avail: NTIS CSCL05A

The broad concept of project authority is analyzed by reducing the universe to a particular organization, NASA, and even further to a particular part of the organization, MSFC Industrial Operations. As a basis for the study, authority is defined as a multitudinous principle involving the relationships among factors of direct authority, responsibility, earned authority, and influence. These factors are then applied to NASA organizational charts and job descriptions. The following conclusions are drawn: (1) The organizational charts fall far short in answering questions which are basic to an understanding of the authority structure. It is a simple process to define authority at the formal level in terms of position and delegation but in reality it becomes an abstraction. (2) While job descriptions offer a diverse range of responsibility from technical expertise to the resolution of group conflicts, there is no real indicator of the nature of the authority delegated to these positions to cover this range of responsibility. (3) Authority is not a function of power and position but becomes coupled with leadership and influence; earned authority is the key to the project authority structure. D.L.G.

N70-21110*# Syracuse Univ., N.Y.

THE COLLEGE OF BUSINESS ADMINISTRATION CIRCA

1985

Richard J. Hopeman Oct. 1968 17 p /Its Occasional Paper No. 1

(Grant NGL-33-022-090)

(NASA-CR-109196) Avail: NTIS CSCL05A

A futuristic look at a college of business administration in a setting sometime beyond the 1980's is presented. A description is given of the students, faculty, off-campus programs, physical facilities, and the administrative organization. Income sources and the research that the college engages in are discussed. J.M.C.

N70-15566*# Syracuse University, N.Y.

MULTIDISCIPLINARY STUDIES IN MANAGEMENT AND DEVELOPMENT PROGRAMS IN THE PUBLIC SECTOR
Semiannual Report, 1 Jan.-30 Jun. 1969

Oct. 1969 34 p refs

(Grant NGL-33-022-090)

(NASA-CR-107656; SAR-3) Avail: NTIS CSCL05A

Four major interdisciplinary research projects, several smaller research activities, and an education and training program for graduate students are presently being conducted at Syracuse University as a result of the association between the University and the National Aeronautics and Space Administration. During this reporting period, members of the four major project teams and others made field trips to NASA Headquarters, NASA field centers, tracking stations both in the U.S. and abroad, universities and private corporations. Extensive research on the major and smaller projects was accomplished. Working papers and preliminary reports were written by faculty and graduate students and papers were delivered at several conferences. A graduate-level seminar on Science and Public Policy was offered and the University-wide NASA Seminar series continued with monthly meetings. Author

N70-15499*# California Univ., Berkeley. Space Sciences Lab.

FUNCTIONAL CONTRIBUTIONS OF BOOTLEGGING AND ENTREPRENEURSHIP IN RESEARCH ORGANIZATIONS

Todd R. La Porte and James L. Wood Sep. 1969 33 p refs /Its Internal Working Paper 106

(Grant NGL-05-003-012)

(NASA-CR-107353) Avail: NTIS CSCL05K

Two activities used by professional scientists to alter their immediate work situation are discussed within the framework of organizational demands. Bootlegging consists of engaging in research projects not formally specified in the contract or grant funding the organizational work. Entrepreneurial activity is the attempt to gain resources for the researcher's project. Both activities permit the satisfaction of personal goals within the constraints of large organizations. Data collected from an industrial research laboratory, a nonprofit university laboratory, and a military defense laboratory were analyzed. The hypothesis that these activities contribute positively to problem solving in research organizations was supported. Both activities contributed most clearly to organizational integration, that is, cooperative relationships, by reducing role strain in scientists and role conflict between scientists and managers. Bootlegging and, to a lesser extent, entrepreneurship seemed to contribute to adaptation and goal attainment, and least to latent value maintenance. Opportunities to engage in either activity seemed to result in higher levels of professionally valued experience. M.H.E.

N70-12675*# Syracuse Univ., N.Y.

PUBLIC ADMINISTRATION AND SCIENCE AND TECHNOLOGY

W. Henry Lambright Sep. 1969 29 p refs Presented at the Ann. Meeting of the Am. Political Sci. Assoc., New York, 2 6 Sep. 1969

(Grant NGL-33-022-090)

(NASA-CR-106905; Rept-6230-WP-1) Avail: NTIS CSCL05B

The history of national science policy is discussed. Budgetary trends in Federal support of basic scientific research in universities and industrial laboratories are illuminated. General proposals are made for establishing an organization to formulate and implement a Federal science policy, and the necessity of Executive and Congressional cooperation in this endeavor is stressed. R.B.

N70-12671# Joint Publications Research Service, Washington, D.C.

CYBERNETICS AND TECHNICAL PROGRESS

V. M. Glushkov 1 Dec. 1969 24 p Transl. into ENGLISH from Radyanska Ukr. (Kiev), 16 Sep. 1969 p 3-4 (JPRS-49352) Avail: NTIS

Cybernetics technology and applications are surveyed. Applications cited include automated production, data processing, economic and management planning, automatic control, and education. J.A.M.

M8 ECONOMICS

N70-79010* Indiana Univ., Bloomington.

AN INDUSTRIAL BREAKDOWN OF NASA EXPENDITURES

Lloyd D. Orr and David Jones Nov. 1969 32 p (NSR-15-003-067)

(NASA-CR-111548) Avail: NTIS

Final demand vector data for fiscal years 1966 and 1967 are presented showing an industrial breakdown of direct expenditures by NASA for the goods and services in support of the space program. The breakdown is by four digit standard industrial classification codes compiled by the Bureau of the Budget. Expenditure categories are administrative operations, research and development, and construction of facilities. Fund sources used in obtaining NASA appropriations are discussed as well as methods used to disaggregate the expenditure data. E.C.

N70-78390 National Science Foundation, Washington, D.C. **SCIENTIFIC AND TECHNICAL PERSONNEL IN THE FEDERAL GOVERNMENT, 1968**

May 1970 39 p refs

(NSF-70-24) Avail: SOD

In October 1968, the Federal Government employed 330,000 scientific and technical personnel, nearly one-tenth of the national total. These included 207,000 civilian scientists, engineers, and professional health personnel and 123,000 related nonprofessional employees. Although the Federal Government remained the nation's single largest employer of scientific and technical personnel in 1968, the increase in professional employment between October 1967 and October 1968 was far smaller than in prior years. The rate of growth in the Defense Department was only about one-half that of the previous year, and the slowdown in space activities resulted in an actual decrease in the employment of scientists and engineers by the National Aeronautics and Space Administration. The levels and characteristics of such employment as of October 1968 are examined, as well as changes in occupational trends over the period 1958 through 1968. Author

N70-77726 Maryland Univ., College Park. **AN ECONOMIC ANALYSIS OF THE RELATIONSHIP BETWEEN INTER-REGIONAL SUBCONTRACTING AND THE REGIONAL ECONOMIC IMPACT OF SELECTED REDUCTIONS IN DEFENSE EXPENDITURES**

Tadeus Lucian Jakubowski (M.A. Thesis) 1 Aug. 1968 140 p refs

(AD-709240) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-75906* National Aeronautics and Space Administration, John F. Kennedy Space Center, Cocoa Beach, Fla.

ECONOMIC IMPACT STUDY: APOLLO PROGRAM

Sep. 1966 68 p refs

(NASA-TM-X-65292) Avail: NTIS

The objective is to ascertain the economic impact, upon the area influenced most directly, if the Kennedy Space Center were to phase down at the conclusion of the Apollo program. For purposes of this evaluation, the current Apollo program is defined as the approved program content through the Apollo-Saturn 515 mission. To determine the impact of such an action, it was necessary to review and analyze the recent growth and the future projections for the area. Carefully reviewed were the number and type of personnel involved, the time period over which the phase down would occur, and the ability of the area to accommodate any major economic shifts. An analysis of this growth, coupled with reliable economic indices, led to the conclusions projected. Author

N70-75518 RAND Corp., Santa Monica, Calif.

ARE COST OVERRUNS A MILITARY-INDUSTRY-COMPLEX SPECIALITY (QUES)

David Novick Mar. 1970 7 p refs Submitted for publication

(AD-703861; P-4311) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-74024 Stanford Research Inst., Menlo Park, Calif.

THE INDUSTRY-GOVERNMENT AEROSPACE RELATIONSHIP. VOLUME 2: SUPPORTING RESEARCH

May 1963 332 p refs Prepared for Aerospace Ind. Assoc. of Am., Inc.

Avail: NTIS

Detailed analyses, methodology, supporting data, and research results are presented for a survey on management relationships between the aerospace industry and the Government. The main issues discussed are: (1) the government contract system as a problem in public policy, (2) an experiment in minimum government surveillance over an industrial space booster development contract, (3) technical program management, (4) impact of statutes, regulations, and policies on individual companies, (5) trends in government procurement policy, (6) a financial profile of the aerospace industry, and (7) a technical profile of the industry. E.C.

N70-74013 Stanford Research Inst., Menlo Park, Calif.

THE INDUSTRY-GOVERNMENT AEROSPACE RELATIONSHIP. VOLUME 1: Report

May 1963 63 p refs Prepared for Aerospace Ind. Assoc. of Am., Inc.

Avail: NTIS

Results are examined of a survey on management relationships between the aerospace industry and the Government. Strengths and weaknesses in the relationship are discussed, problems are identified, and suggestions for resolving them are given. E.C.

N70-37109# National Science Foundation, Washington, D.C. Office of Economic and Manpower Studies.

FEDERAL FUNDS FOR R AND D CONTINUE TO REMAIN LEVEL

14 Aug. 1970 4 p
(NSF-70-28) Avail: Issuing Activity

The decrease in government support for research and development in the United States is reported. A tabular breakdown is given which shows the amount of basic and applied research, as well as development, and funds provided by the Federal Government, according to the agency receiving the funds. The major support agencies include the Department of Defense, NASA, and the Atomic Energy Commission. R.B.

N70-21119*# Syracuse Univ., N.Y.

THE APOLLO PROJECT MANAGER-CONTRACTOR INTERFACE

Eugene E. Drucker Oct. 1969 17 p ref /ts Working Paper No. 4

(Grant NGL-33-022-090)

(NASA-CR-109188) Avail: NTIS CSCL05A

NASA-Contractor interface is outlined using field interviews of contractor personnel. The similarities and differences between the Manned Space Center and the Manned Space Flight Center

are compared, as well as NASA and contractor styles of project management. It is concluded that these differences come from dissimilar organization motivation. Interface variations were attributed to differences in institutional history and key-figure characteristics. J.A.M.

N70-21072*# Miami Univ., Fla.

FEDERAL SUPPORT AND STIMULATION OF INTERDISCIPLINARY RESEARCH IN UNIVERSITIES

D. E. Cunningham Oct. 1969 87 p

(Grant NGR-36-022-001)

(NASA-CR-108940, Rept-69-142) Avail: NTIS CSCL05B

The results of an attempt to determine what actions the various agencies of the Federal Government were taking in stimulating and supporting interdisciplinary research are described. The data were accumulated by visits to many federal agencies, and talks with many administrators of interdisciplinary research. This report attempts several things: (1) It looks to the need for conducting interdisciplinary research in our present day society. It examines what interdisciplinary research is, how it is conducted, and who is sponsoring it. (2) It looks to the methods so far used by Federal agencies to support research, not necessarily confining itself to the subject of interdisciplinary research. (3) It examines the drawbacks, limitations, etc., of the various forms of support so far used. It then considers how these various techniques of support could be directly applied to the support of multidisciplinary research. (4) It looks at the general limitations of conducting any type of interdisciplinary research program in the university, as the university now is structured. (5) It lists in tabular form the varied agencies of the Federal Government that are supporting interdisciplinary research, the means through which they are supporting it, the dollar amounts committed per year, and describes the general nature of each of the programs. (6) It reaches some conclusions concerning which techniques might be most appropriate for conducting and stimulating interdisciplinary research in the short run. Author

N70-20857# National Science Foundation, Washington, D.C.
FEDERAL FUNDS FOR RESEARCH, DEVELOPMENT, AND OTHER SCIENTIFIC ACTIVITIES, FISCAL YEARS 1968 - 1970, VOLUME 18

Aug. 1969 288 p

(NSF-69-31) Avail: Issuing Activity

The funding allotments for basic and applied research, science and engineering activities, information obligations, agencies, and R&D plants are described. Levels and trends, and geographic distribution are given, and technical notes and statistical tables are included. N.E.N.

N70-16936*# Washington Univ., St. Louis, Mo. Dept. of Economics.

THE FEDERAL GOVERNMENT AND THE STATES: THE POST VIETNAM OUTLOOK

Murray L. Weidenbaum Dec. 1968 13 p Presented at the Natl. Conf. of State Legislative Leaders, Honolulu, 6 Dec. 1968

(Grant NGR-26-008 003)

Avail: NTIS CSCL05C

This study deals with the financial interrelationships between Federal programs and state governments. It is hoped that the information contained in it will be useful for policy-makers concerned with the role of the national space program in a post-Vietnam context. Author

M9 GENERAL

N70-76926 General Accounting Office, Washington, D.C.

GLOSSARY FOR SYSTEMS ANALYSIS AND PLANNING-PROGRAMMING-BUDGETING

Oct. 1969 73 p ref

Avail: Issuing Activity

The revised glossary contains 195 entries described in the context of decision making by Government executives. The glossary is prefaced by a discussion of the role of systems analysis and planning-programming-budgeting in Government. E.C.

N70-73386 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

A COMPENDIUM OF AUTHENTICATED LOGISTICS TERMS AND DEFINITIONS

Fred Gluck Jan. 1970 536 p refs

(AD-700066; AFIT-TR-5) Avail: NTIS

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries

N70-40838*# National Aeronautics and Space Administration, Washington, D.C.

MANAGEMENT: A CONTINUING LITERATURE SURVEY, WITH INDEXES

Jun. 1970 111 p refs

(NASA-SP-7500(04) Avail: NTIS CSCL05A

A compilation of references to selected unclassified reports and periodical articles on the subject of management is presented. The assembled citations are for material entering the NASA and DoD information systems in 1969. Author

N70-39717# Commerce Dept., Washington, D.C. Office of the Secretary.

THE ROLE OF SCIENTISTS AND ENGINEERS IN DEVELOPING PUBLIC POLICY Address by Assistant Secretary of Commerce for Science and Technology

Myron Tribus 3 Apr. 1970 15 p Presented at the Eastern Regional Conf. on the Appl. of Sci. and Technol. to Public Programs, Boston, 3 Apr. 1970; sponsored by the New Engl. Econ. Res. Found.

Avail: Issuing Activity

The need for engineers with humanist background and outlook, and the education of engineers in the area of social conscience and responsibility are discussed. It is felt that conflict arises at the interface between technology and society and that there are too few people who can function at this interface. Studies are quoted which indicate the engineer considers himself a highly trained technical person capable of producing what he is told to do because

of his specialized training, but does not consider himself as a guardian of society and the environment and taking action in human problem fields. It is suggested that humanist courses be taught to the student engineer, not as given to liberal arts students, but geared specifically so as to involve the student emotionally and have him participate as an engineer. What the young student engineer requires is an opportunity to grapple with total problems, such as urban and environmental problems, and to be involved in creative experiences.

N.E.N.

N70-37594# Congress. House. Committee on Science and Astronautics.

THE MANAGEMENT OF INFORMATION AND KNOWLEDGE

Washington GPO 1970 137 p refs Presented at the 11th ann. meeting of the Panel on Sci. and Technol. with the Comm. on Sci. and Astronaut., 91st Congr., 2d Sess., Feb. 1970

Avail: SOD CSCL 05B

Selected papers are presented on information management topics including: post industrial society in the United States and economic history with comparisons to Japan and Germany, managing modern complexities and forecasting with computers, self-liquidating ideals in American attitudes toward technology, individual privacy, self image, and obsolescence in respect to computer and communications technology, mass media and communications systems, education as an information system, and policy directions for education in post-industrial America. J.M.

N70-37083*# Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.

AGING, CREATIVITY, INTER-SPECIALITY MOBILITY, RETRAINING, AND TECHNICAL OBSOLESCENCE OF SCIENTIFIC AND TECHNICAL PERSONNEL: A SELECTED BIBLIOGRAPHY

Richard T. Barth Jan. 1970 22 p refs

(Grant NGR-14-007-062)

(NASA-CR-112776) Avail: NTIS CSCL 05I

The entries were selected on the basis of their relevance to the following typical researchable and organizational design topics: how to help engineers and scientists change fields or specialties in midcareer; the effect of age on the scientist's and engineer's ability to redirect or change his career; technical obsolescence, how it should be measured, and how it is related to organizational aging; the role of continuing education in preventing technical obsolescence; and the concerns of research scientists and engineers who are reassigned into development activities.

Author

N70-35482# Defense Documentation Center, Alexandria, Va.

SMALL GROUP DYNAMICS, VOLUME 1 A DDC Bibliography, Aug. 1952 - Mar. 1969

Feb. 1970 494 p refs

(AD-703600: DDC-TAS-69-78-1) Avail: NTIS CSCL 5/10

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-33868*# National Aeronautics and Space Administration. Electronics Research Center, Cambridge, Mass.

A BIBLIOGRAPHICAL SURVEY OF LARGE-SCALE SYSTEMS

William R. Corliss 30 Jun. 1970 57 p refs

(NASA-TM-X-64293) Avail: NTIS CSCL 09B

A limited, partly annotated bibliography was prepared on the subject of large-scale system control. The references are divided into thirteen application areas, such as large societal systems and large communication systems.

Author

N70-32810# Defense Documentation Center, Alexandria, Va.
MANAGEMENT INFORMATION SYSTEMS, VOLUME 1 Report Bibliography, May 1944 - Oct. 1969

Apr. 1970 282 p refs

(AD-704960: DDC-TAS-70-43-1-Vol-1) Avail: NTIS CSCL 5/1

For abstract see appropriate AD number (shown above) in corresponding category under DDC entries.

N70-29979*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

MANAGEMENT: A SELECTIVE BIBLIOGRAPHY

28 May 1970 185 p refs

(NASA-TM-X-62945: GP-532-Suppl) Avail: NTIS CSCL 05A

This supplement follows the format of the original bibliography. The six hundred and forty six items listed are arranged alphabetically by title. Entries have been annotated only when the book was available for examination. The author and subject index will facilitate finding the materials included. A list of periodicals and newspapers wholly or partially devoted to management is included. Author

N70-21107*# Syracuse Univ., N.Y.

BIBLIOGRAPHICAL REFERENCE OF ACCURACY OF COST INFORMATION FOR DECISION-MAKING

Mohammed Onsi 5 Sep. 1969 41 p refs

(Grant NGL-33-022-090)

(NASA-CR-109181) Avail: NTIS CSCL 05A

A bibliography is presented examining literature related to the accuracy of cost information for decision making. Areas of accounting, management, quantitative analysis, industrial engineering, and economics were investigated. Government reports, NASA publications, and recent periodicals were used as references.

J.A.M.

N70-14798*# Syracuse Univ., N.Y.

MULTIDISCIPLINARY STUDIES IN MANAGEMENT AND DEVELOPMENT PROGRAMS IN THE PUBLIC SECTOR: PUBLICATIONS LIST

Martin E. Barzelay Dec. 1969 8 p refs

(Grant NGL-33-022-090)

(NASA-CR-107457) Avail: NTIS CSCL 05A

A bibliographical listing is presented of working and occasional papers, reports, theses and dissertations, and publications on the role of the project manager, regulations in space, NASA and business community relations, noneconomic criteria for project evaluation, exposition and real time decision making, case studies, and miscellaneous research.

J.A.M.

IAA ENTRIES

M1 PROGRAM & PROJECT MANAGEMENT

A70-44696 * # Management aspects of manned space flight programs. Charles W. Mathews (NASA, Washington, D.C.). *International Astronautical Federation, International Astronautical Congress, 21st, Konstanz, West Germany, Oct. 4-10, 1970, Paper.* 31 p.

This paper will outline the factors involved in the management of large space programs which include many classes of organizational, disciplinary, hardware and software interfaces. At the outset, the progress in the management field to date will be described up to and including the Apollo program. Some of the differences to be expected from the unique characteristics of future programs, including broad international participation, will be discussed, using as a backdrop the experiences with present and past activities. This discussion will center around the novel features of the space shuttle and the space station. In particular, the paper will deal with the organizational aspects stressing means for obtaining accurate and timely information flow, as well as means for obtaining good program control, motivation, and flexibility. The relationship among functional, projectized and matrix management will be included. Emphasis will be placed on a high degree of flexibility for user participation in future programs. (Author)

A70-43625 Project management with CPM and PERT (2nd edition). J. J. Moder (Miami, University, Coral Gables, Fla.) and C. R. Phillips (Kurt Salmon Associated, Inc.). New York, Van Nostrand Reinhold Co., 1970. 370 p. 85 refs. \$14.95.

The theory and practice of CPM (critical path method) and PERT (program evaluation and review technique) are described for planning, scheduling, and control of project activities. The first of two parts comprises a complete course in the fundamentals of the planning and scheduling features of critical path methods, including manual and computer methods of calculation. Topics covered in this section concern the development of the network, time estimates and level of detail, basic scheduling computations, and computer critical path programs. The second part is intended for more advanced users and college students. Attention is given to various networking schemes and generalized networks that have evolved over the past decade. Scheduling of activities to satisfy resource constraints is examined, together with time-cost tradeoff procedures. Problems in network cost control are analyzed, and the PERT statistical approach is detailed. Special attention is paid to resource allocation. T.M.

A70-35507 The steps to successful application development. Kenneth R. Harstad (Collins Radio Co., Cedar Rapids, Iowa). In: *Instrumentation in the aerospace industry. Volume 15 - Instrument Society of America, International Aerospace Instrumentation Symposium, 15th, Las Vegas, Nev., May 5-7, 1969, Proceedings.* Edited by B. Washburn. Pittsburgh, Instrument Society of America, 1969, p. 264-269.

Discussion of a sequence of twenty steps necessary for the

development and implementation of a data processing system. A graph presents the sequence, degree of magnitude, manpower required, and time required for each of the steps. This graph is supported by details relating to the resources, specifications, testing, evaluation, and responsibility pertaining to each of the development steps, and to the status reporting to management. The need is emphasized for data processing personnel to provide follow up and system improvements after the system is operational. M.V.E.

A70-35487 Planning a management program for maintenance and repair of a digital data system. E. H. Henderson (North American Rockwell Corp., Rocketdyne Div., Canoga Park, Calif.). In: *Instrumentation in the aerospace industry. Volume 15 - Instrument Society of America, International Aerospace Instrumentation Symposium, 15th, Las Vegas, Nev., May 5-7, 1969, Proceedings.* Edited by B. Washburn. Pittsburgh, Instrument Society of America, 1969, p. 97-102.

After a new data system has been installed and acceptance tested, emphasis is shifted to the operation phase where a new set of problems arise. How, when, where, and by whom should maintenance functions be performed. How much will it cost. Should spare parts be purchased, etc. This article will discuss the options available, the criteria that must be established, and some of the consequences expected. (Author)

A70-34918 Project management - A science, an art or an organization problem. D. M. Hardy (Hawker Siddeley Aviation, Ltd., Brough, Yorks., England). *Aeronautical Journal*, vol. 74, June 1970, p. 469-471; Discussion, p. 471.

Discussion of proper project management in an aircraft manufacturing firm with specific examples of project management in relation to an aircraft weapon system required for the British Armed Services. The functions of three different project teams are described in connection with responsibilities of the prime contractor and two governmental agencies: the Ministry of Defense and the Ministry of Technology. T.M.

A70-30524 Planning and control management perspective. S. F. Haugh (North American Rockwell Corp., Autonetics Div., Anaheim, Calif.). *National Contract Management Journal*, vol. 4, Spring 1970, p. 101-118.

Outline of a technique for interrelating the elements used in the development of a price estimate through the use of a three-dimensional matrix. Systematic estimating, using the matrix as an outline, results in an easy to follow cost breakdown that can be directly applied to schedule/cost requirements, and automatically produces a work breakdown structure. When properly employed, a computer can utilize the matrix data to extract element-by-element cost data, and sums can be obtained for each element along any of the three axes. Relationships that appear to be out of line will be easily identified and investigated. Z.W.

A70-30521 Cost estimate growth pressures influencing the Air Force SPO director in his decision-making role. Richard J. Lorette (USAF, Institute of Technology, Wright-Patterson AFB, Ohio). *National Contract Management Journal*, vol. 4, Spring 1970, p. 1-29.

Investigation of the relationship between cost estimate growth of new projects and pressures on the director of the Air Force System Program Office (SPO). The research methodology and charter of the SPO director are briefly described. The impact of the program change request process as the SPO director attempts to implement his charter, is discussed. The subject of pressures on the director is introduced, and a system is developed for a simulation model of the cost estimate pressures within the weapon acquisition process. In conclusion, recommendations are presented indicating areas which might be further investigated. Z.W.

A70-29692 Configuration management of software. F. Liguori (Emerson Electric Co., St. Louis, Mo.). In: Institution of Electronic and Radio Engineers, Joint Conference on Automatic Test Systems, University of Birmingham, Birmingham, England, April 14-17, 1970, Proceedings. Conference co-sponsored by the United Kingdom Automation Council. London, Institution of Electronic and Radio Engineers, 1970, p. 441-450. 9 refs.

Discussion of the configuration management of software concerning the automatic test systems. The configuration management is defined and its need and role in the process of producing large quantities of operational test programs for test systems are described. Special attention is given to the application of automatic test equipment in the maintenance depot for testing large quantities of units under test. Z.W.

A70-28679 # The role of industry. J. R. Powell, *British Interplanetary Society, Sounding Rocket and Experimental Results Symposium, Cardiff University, Cardiff, Wales, Apr. 15-17, 1970, Paper. 8 p.*

Discussion of the role of industry as applied to a sounding rocket program. The implications of each particular area of activity are highlighted. The wide range of skills needed by a sounding rocket contractor are indicated. It is pointed out that, although the amount of each activity may be fairly small, the overall task is quite large. As an example, the BAC involvement with Skylark includes some 40 individual contracts and employs over 100 engineers full time. M.M.

A70-24662 Production scheduling on N identical machines. M. J. L. Kirby and P. F. Scobey (Dalhousie University, Halifax, Canada). *Canadian Operational Research Society, Journal*, vol. 8, Mar. 1970, p. 14-27. 6 refs. National Research Council Grant No. A-4024; Defence Research Board Grant No. 9540-14.

Consideration of a production scheduling problem in which it is required to minimize the sum of the total changeover and inventory costs incurred by producing K products on N identical machines (K greater than N), coupled so that they operate or shut down together, when production must be scheduled to meet given demands for each product in each period. It is shown that this problem can be formulated as a mathematical programming problem with a nonlinear objective function, with constraints equivalent to those of a network model, and with the variables restricted to integer values. This problem is then converted to an equivalent linear programming problem in integer variables. A method for generating a feasible integer solution to the given problem by rounding off the optimal continuous solution to the linear problem is presented. Computational results are given which indicate that the rounded-off solution is a near-optimal integer solution. (Author)

A70-23545 * # Management requirements for large field programs. Homer E. Newell (NASA, Washington, D.C.). (U.S. Global Atmospheric Research Program Conference, Boulder, Colo., Oct. 17, 1969.) *American Meteorological Society, Bulletin*, vol. 51, Jan. 1970, p. 30-34.

Discussion of the management plan necessary to manage the complicated and difficult Global Atmospheric Research Program (GARP). The GARP objectives are outlined, and the preparation of the management plan is discussed in detail. Several measures recommended for the management of GARP are summarized. O.H.

A70-17601 PROCESS SPECIFICATIONS.

Ford McCormack (Lockheed Missiles and Space Co., Sunnyvale, Calif.).

Machine Design, vol. 42, Jan. 8, 1970, p. 96-100.

Description of the contents, purposes, and preparation of process specifications used to control manufacturing operations.

There are three recognizable levels of control at which process specifications can be written. These levels are used to distinguish three types of specifications: (1) the all-encompassing process specification, (2) the technical disclosure specification, and (3) the design control process specification. Advantages and disadvantages of each are compared, and basic criteria are outlined which can be used to determine whether a process specification is needed as a measure of control. Guidelines for writing process specifications are listed together with special applications. T.M.

A70-16463 # LET'S USE THE "SYSTEMS APPROACH" TO UNIFY ACQUISITION MANAGEMENT.

George W. Scott (USAF, Space and Missile Systems Organization, Technical Requirements and Standards Office, Los Angeles, Calif.). *Aerospace Management*, vol. 4, no. 2, 1969, p. 53-57.

Comments on approaches toward development of an improved acquisition management system. A "systems approach" toward an integrated acquisition management, engaging the creative abilities of some of the top managerial talent to be found in government and industry, is felt necessary. Specific steps and procedures to be followed are outlined and discussed. M.V.E.

A70-16462 # SYSTEMS ENGINEERING MANAGEMENT—ITS PRINCIPLES AND ITS PRACTICE.

Joseph F. Slomski.

Aerospace Management, vol. 4, no. 2, 1969, p. 39-51.

Description of a systems engineering management process aimed at satisfying the general requirements of MIL-STD-499. This standard specifies no particular process, but sets criteria for the need for a formal auditable process. The description of this process attempts to show how the process provides the general inputs to the work breakdown structure and to the Cost/Schedule Planning and Control System's requirements. The detailed procedures of the functional analysis, the tradeoffs and the resulting design analysis data bring to light the critical technical performance parameters affecting the design and development of the chosen solution. M.V.E.

A70-16460 # GUIDELINES FOR ACQUISITION MANAGEMENT GLEANED FROM DOD'S SYSTEMS EXPERIENCE.

John S. Foster, Jr. (U.S. Department of Defense, Washington, D.C.). *Aerospace Management*, vol. 4, no. 2, 1969, p. 5-9.

Discussion of acquisition management tools and policies of the Department of Defense. The lessons of the 1950s and 1960s acquisition experience and the steps taken to put these lessons to good use are reviewed. In particular, one major improvement adopted since the end of 1967, the development concept paper, is shown to be a most important decision-making tool. Furthermore, the constant stream of scientists, businessmen, and professional management consultants, encouraged to conduct dialogs with DOD's acquisition management, exposes the latter to constructive criticism and knowledgeable feedback on its ideas. M.V.E.

A70-15846 THE ECONOMICS OF INTEGRATED LOGISTICS SUPPORT.

Ernest C. Seaberg and Wendell A. Triplett (Radio Corporation of America, New York, N.Y.).

Society of Automotive Engineers, National Aeronautic and Space Engineering and Manufacturing Meeting, Los Angeles, Calif., Oct. 6-10, 1969, Paper 690632. 19 p. 8 refs.

Members, \$1.00; nonmembers, \$1.50.

Discussion of techniques for evaluating the economics of integrated logistics support as applied to the selection of support systems. The prime objective is to develop methods for generating

quantitative data for cost optimization of support philosophy, including test equipment selection, manpower factors, inventory factors, facilities, deployment, and equipment maintenance considerations. A deterministic model is described, and its capability is evaluated in terms of versatility to evaluate many alternatives rapidly and inexpensively. This includes sensitivity testing of significant parameters to evaluate the cost effectiveness trends of support alternatives. Input data requirements are also reviewed along with various cost effectiveness indices used to judge the system's worth based on quantitative results representative of specific applications. (Author)

A70-13963**WHY DOES PROJECT MANAGEMENT FAIL?**

Ivars Avots.

California Management Review, vol. 12, Fall 1969, p. 77-82.

Discussion of why highly developed project management systems fail more often than they succeed. Some indications of project management failure are high costs or schedule overruns, poor-quality products, or failure to meet project objectives. It is suggested that, when starting off in project management, the whole concept should be accepted. The project manager's qualifications should be high, and efforts should be made to lay out project groundwork and to define work. Long before a project ends, means should be provided for accommodating the employees' personal goals. F.R.L.

A70-11672 #**SPARES MANAGEMENT OF LARGE AIRPLANE CONTRACTS.**
T. R. May (Lockheed Aircraft Corp., Lockheed-Georgia Co., Marietta, Ga.).*Logistics Spectrum*, vol. 3, Fall 1969, p. 17, 18, 30.

Discussion of spares management of large aircraft contracts as seen through the eyes of top management as a help for establishing better lines of logistic communications. It is pointed out that today's emphasis is on "total systems." Therefore, aspects of spares management are viewed in relationship to the broader subject of total, integrated logistics support systems management. G.R.

A70-11671 #**INTEGRATED MATERIEL MANAGEMENT.**

A. A. Riemony (USAF, Washington, D.C.).

Logistics Spectrum, vol. 3, Fall 1969, p. 11-13, 16.

Discussion of a reduction of systems or product costs by integrated materiel management. The importance of team effort for the effectiveness of materiel support is emphasized. Preliminary programs are discussed, and an integrated materiel management system is described. The assignment of responsibilities is examined. The system described is for management of ultraexpensive spares. It is pointed out that management resources and technical knowledge throughout the broad spectrum of managing high-cost spares have to be applied collectively in order to provide the operator with the tools to do his job effectively and at minimum cost. G.R.

A70-10605 #**THE FREIGHT-SHAPED FUTURE.**

F. A. Cleveland (Lockheed Aircraft Corp., Lockheed-Georgia Co., Marietta, Ga.).

American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display, 6th, Anaheim, Calif., Oct. 20-24, 1969, Paper 69-1091, 17 p.

Members, \$1.00; nonmembers, \$1.50.

Discussion of the impact of future air freight and passenger demand on airport location and configuration. Objective analyses are made of the peculiar requirements and interfaces related to receiving, processing, and dispatching of passengers and goods within an airport system. Particular emphasis is accorded to the air freighter. The system engineering approach is developed and applied to the total airborne, airport, and community socioeconomic structure in

determining the significant influences of the forecasted air freight and passenger demand on airport location and configuration. Requirements are derived through functional analysis, and conceptual solutions are proposed for effective exploitation of the economic potential of the air transportation industry. O.H.

A70-10114**SUPPORT SYSTEM COST EFFECTIVENESS.**

Wendell A. Triplett (Radio Corporation of America, Moorestown, N.J.).

IN: RCA QUALITY ASSURANCE.

Moorestown, N.J., Radio Corporation of America, 1969, p. 37-41.

Research sponsored by the Radio Corporation of America.

Outline of the basic rationale of a planned systematic approach to the problem of providing support for complex operational systems. This approach is called integrated logistic support. It is shown how integrated logistic support can be applied in a cost effectiveness study. An example of the extent of application of this approach to study support costs for a ground communications system is given. Cost models are evaluated to demonstrate their application in the formulation of logistic support plans and in achieving the proper balance between logistics and performance early in the design process. It is concluded that integrated logistic support tradeoffs can significantly influence support equipment design, including the effects of operational constraints and considerations of commonality and integration of test functions to avoid duplication of equipment, and other factors involving development, mobility, availability, and test system support. P.G.

M2 CONTRACT MANAGEMENT**A70-42723****A guide to aerospace-defense contracts.**

Emerson Clarke (Zenith Radio Corp., Chicago, Ill.). New York, Industrial Press, Inc., 1970. 263 p. 71 refs. \$12.

The essentials of the aerospace defense contract field are described from the practical point of view. In the first part, the questions how the government procures aerospace-defense supplies and services, and how industry and others respond with science and technology are dealt with. Within this framework, the basic products and the major participants are reviewed. The origin of the procurements and principal buyers is described. The role played by specifications and standards in the control of the purchase is examined together with the fundamentals of marketing as they apply to the technical people. The origins of the procurement, the contents of the invitation, and the recipient company's initial reaction are outlined. Special attention is given to the negotiation and acceptance of the contract. The project management system is examined. The second part explains the inevitable paperwork, or 'data,' that is part and parcel of most government contracts. The big paperwork items including reports, technical manuals, provisioning, and configuration management are reviewed. The book is intended for anyone who does business with the Federal Government. Z.W.

A70-30525**Contractor All Risk Incentive Contract**(CARIC). Barney M. Versel (USAF, Washington, D.C.). *National Contract Management Journal*, vol. 4, Spring 1970, p. 133-143.

Description of the contractor all risk incentive contract (CARIC) in which all the primary and lateral objectives of both the buyer and the seller are accomplished. Three major innovations are introduced into incentive contracting: (1) an anticipated cost which has no penalty implications, (2) all performance and schedule incentives are completely integrated with the cost incentive into a single profit formula, and (3) no basic target profit/fee is negotiated. Elements which must be negotiated for a CARIC contract are discussed. Z.W.

A70-30523 Incentive earnings and payments during performance of CPIX contracts. John H. Love (Ball Brothers Research Corp., Boulder, Colo.). *National Contract Management Journal*, vol. 4, Spring 1970, p. 61-87. 35 refs.

Analysis of the fundamental character or purposes underlying incentive earnings in terms of the legal principles. The alleged inadequacy of the various provisions and the proposed revisions are evaluated. The principles involving interpretations, liquidated damages, just compensation, and equitable estoppel are discussed in terms of justifying major alterations to the various provisions. Certain other principles are briefly discussed taking into consideration their effect upon incentive earnings or their potential use in a specific claim. The ambiguities of the clauses are identified under the subjective intention theory. Z.W.

A70-19678 MAJOR DOD PROCUREMENTS AT WAR WITH REALITY. Hudson B. Drake.

Harvard Business Review, vol. 48, Jan.-Feb. 1970, p. 119-140.

Overview of the origins and workings of the Defense Department's current practices for procuring advanced weapon systems. It is pointed out that many of the recent and highly publicized overruns are rooted in a basic flaw in government policy. Specifically, the government does not recognize the softness of the technologies used in these systems, and tries to write and administer contracts as though the technology were well in hand and no unexpected problems could possibly crop up. It is emphasized that this situation is of concern to business at large, and not just the major defense contractors, because the government is likely to repeat this error in other areas, now and in the future, when it seeks to combine with industry to bring large, novel, and sophisticated systems into existence. M.M.

A70-19672 SOLVING PROCUREMENT PROBLEMS.

Robert C. Seamans, Jr. (USAF, Washington, D.C.).

Defense Management Journal, vol. 5, Fall 1969, p. 2-5.

Discussion of procurement problems for the Defense Department taking into consideration the development of the new fighter F-15 for the Air Force. Inescapable procurement realities are examined and past and present attempts to deal with difficult procurement problems are discussed. G.R.

A70-13962 TOP MANAGEMENT AND THE SELECTION OF MAJOR CONTRACTORS AT NASA.

Willard I. Zangwill (California, University, School of Business Administration, Berkeley, Calif.).

California Management Review, vol. 12, Fall 1969, p. 43-52.

Detailed description of the NASA Source Evaluation Board (SEB) process for evaluating and selecting a major contractor. The purpose of this process is to provide insight into NASA procurement practices and to give information about management techniques. SEB analyzes proposals offered to meet a NASA requirement according to previously decided weights and performance criteria, such as those for a first-stage booster for manned space flight, and presents its findings to top management. The SEB decision is studied by a special ad hoc independent board. Line personnel are skipped. Top management people further the integrity and fairness of the process, and, when deciding upon the contractor, add their own perspective to SEB's detailed proposal analysis. They attempt to motivate the personnel and employ the SEB process in an effort to further the goal of a joint NASA industry space effort. They handle Congressional inquiries and utilize the SEB process to obtain and disseminate information and to train and educate personnel. F.R.L.

M3 RESEARCH & DEVELOPMENT

A70-41175 Methodology for improving subjective R & D estimates. Ronald J. Ebert (Washington, University, Seattle, Wash.). *IEEE Transactions on Engineering Management*, vol. EM-17, Aug. 1970, p. 108-116. 20 refs.

Subjective probability estimates underly many decision techniques and project evaluation methods used in R and D. Recent research efforts of others in the study of subjective probability have resulted in methodological developments that may have useful R and D applications. This paper illustrates how such methods might be applied in an R and D context. It is suggested that such methods may improve personal probability assessments, and, under some circumstances, may be useful in evaluating the relative assessment performances of the different assessors. (Author)

A70-41172 Model for predicting risk in scheduling proposed R and D tasks. Robert D. Doering (Florida Technological University, Orlando, Fla.). *IEEE Transactions on Engineering Management*, vol. EM-17, Aug. 1970, p. 80-92. 18 refs.

Development of a model that can be used to predict a potential variance from planned schedule for a given R and D task. The task is defined as the net increase in knowledge required to move from the initial level of basic knowledge about the problem to the level specified for its accomplishment. Variables are identified that affect the time required for attainment of successive knowledge-state levels, assuming that an adequate technical solution is feasible and adequate funds are available. The variables are defined and evaluated for sixteen historical R and D tasks. This information is used to structure a predictive model for time to attain intermediate knowledge states given values for the variables associated with these subactivities. G.R.

A70-33663 A set of working principles for effective research management. G. P. Smith (Corning Glass Works, Corning, N.Y.). *Research Management*, vol. 13, July 1970, p. 301-313. 21 refs.

Discussion of a number of working principles that should be followed for effective management of research and development in an industrial enterprise. The importance of an integration of the goals of the research organization with the changing goals of the company is emphasized. The research program must be geared to changes in policy and technology, and opportunities must be recognized. The organization must be flexible and an environment that fosters invention should be provided. The importance of the adequate reporting and utilization of research results is stressed. G.R.

A70-31573 Decision making in the management of research and advanced development activities. Barrett Hazeltine (Brown University, Providence, R.I.). *IEEE Transactions on Engineering Management*, vol. EM-17, May 1970, p. 61-65. 20 refs.

Discussion of decision-making as applied to management contributions towards the success of research and advanced development on the basis of a framework borrowed from statistical decision theory. Problems in managing research and advanced development are analyzed and management's contribution to research-type activities are discussed. A decision-making technique for management of research-type activities is described. G.R.

A70-31393 A probabilistic approach to aeronautical research and development. R. A. Harvey (BAC, Ltd.). *Aeronautical Journal*, vol. 74, May 1970, p. 373-380.

Examination of research and development in the aerospace industry from a probabilistic viewpoint taking into consideration questions of the relationship between research activity and the output from it. Research and development in the aeronautical context are defined and the application of the outputs from research is considered. Aspects of the problem of placing a value on research are investigated. Advantages of building prototypes instead of going into immediate production are examined. A decision tree illustrating the effect of research inputs on innovation is presented. G.R.

A70-30367 * The management of Department of Defense laser research contracts. William A. Davis, Jr. (U.S. Army, High Energy Laser Branch, Redstone Arsenal, Ala.) and Edward B. Roberts (MIT, Cambridge, Mass.). *Journal of Business*, vol. 43, Jan. 1970, p. 44-55. Grant No. NSG-235.

Study of the effectiveness of DoD laser research and development contracts, with particular reference to the performance of contractors. The influence of government contract monitors and contracting agencies is also considered. An effort is made to depict the DoD procurement process, or scheme for 'buying' research, as it actually exists and operates at the working level of defense agencies. Using a representative sample of contracts, the process is typified, a profile of the government contract monitor is drawn, a cross section of contractors is described and evaluated, and the 'end product' is assessed. V.P.

A70-27750 Managing university research - Personnel and organizational policies. Joseph W. Garbarino (California, University, Berkeley, Calif.). *California Management Review*, vol. 12, Spring 1970, p. 65-75. 10 refs. NSF Grant No. GS-1059.

Analysis of some of the personnel and organizational policies that evolved when the universities became a major supplier to the organized research industry. It is pointed out that in the research market the suppliers do not passively accept the existing structure and level of demand, but actively intervene to influence it. The university sector of the research industry is examined. Special attention is given to the changes in the university character and their consequences. Z.W.

A70-27006 Computers in R and D and engineering - Proceed with care. Lawrence S. Hill (California State College, Los Angeles, Calif.). *Research Management*, vol. 13, May 1970, p. 191-200. 10 refs.

Discussion of some constraints and problems relevant to the efficiency of automation of engineering and design processes. Because of the revolutionary nature of the emerging computer technology, there has been a tendency to overstate the near-term advantages and significance of automation and computerization. The generalizations and oversimplifications underlying many of the widespread misconceptions about automation are identified and discussed. It is felt that the reviewed critical effects have so far failed to be adequately recognized by practitioners and theorists in the field of management. M.V.E.

A70-24070 # A survey of models for the evaluation and selection of research projects. Klaus Brockhoff (Battelle-Institut, Frankfurt am Main, West Germany). *Battelle Information*, Feb. 1970, p. 5-14. 22 refs.

Discussion of the reasons for a research and development planning, and survey of models for evaluating and selecting the research projects. The necessity of a long-range company planning is examined taking into account the elements of planning and realization of objectives by research and development. The criteria of efficient planning methods are discussed. Special attention is given to the planning problems in the cases when the cash flows for individual projects are measurable and not measurable. Z.W.

A70-23410 * A program of research on coupling relations in research and development. Albert H. Rubenstein and Charles F. Douds (Northwestern University, Evanston, Ill.). *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 137-143. 22 refs. Army-NASA-NSF-supported research.

As part of a continuing program of studies of R&D, one area for field research has been identified that is concerned with coupling the flow of ideas about new materials, products, and processes from the laboratory through the steps to utilization. The various complex communication phenomena involved—liaison, interface, coupling, technology transfer (LINCOTT)—are treated in a series of eleven studies. Each has a unique focus and set of variables. They cover a variety of environments—commercial and military laboratories, U.S. firms overseas, and R&D in developing countries. But all the studies share the common goal of increasing understanding of communication and information exchange between functionally related science, engineering, production, and management groups, with the eventual goal of providing tested propositions for improved organizational design. (Author)

A70-20824 * Coupling relations in product and systems development. Albert H. Rubenstein, Richard T. Barth, and Charles F. Douds (Northwestern University, Evanston, Ill.). In: National Electronics Conference, Chicago, Ill., December 8-10, 1969, Proceedings.

Conference sponsored by the Illinois Institute of Technology, the Institute of Electrical and Electronics Engineers, Northwestern University, and the University of Illinois. Oak Brook, Ill., National Electronics Conference, Inc. (NEC, Proceedings, Volume 25), 1969, p. 893-898. 8 refs. Army-NASA-NSF-supported research.

Discussion of a project of coupling phenomena currently underway in a larger program of research on R and D. The project consists in investigating the coupling of technical groups within R and D organizations. Some preliminary observations from 2 studies of the project are made. M.M.

A70-19001

DECISION TREE ANALYSIS FOR INDUSTRIAL RESEARCH.

R. A. Flinn (Bethlehem Steel Corp., Bethlehem, Pa.) and E. Turban (Lehigh University, Bethlehem, Pa.).

Research Management, vol. 13, Jan. 1970, p. 27-34.

Description of the application of decision trees to the selection of research projects. An example case, synthesized to show the various steps in decision tree analysis, is used. Decision trees outline the path anticipated for a project and identify the more critical and costly stages. The decision tree method then predicts a probable return on the research investment. The decision tree method can be used through the course of a project as a control device. M.M.

A70-17603

EVALUATING R AND D ORGANIZATIONS.

E. M. Glass (U.S. Department of Defense, Directorate of Defense Research and Evaluation).

Research/Development, vol. 21, Jan. 1970, p. 23-27.

Description of methods by which the U.S. Department of Defense (DOD) evaluates the quality and performance of government laboratories. The views of the Daddario Subcommittee on Science, Research, and Development are outlined, and the reasons for DOD interest in appraisal are discussed. Attention is given to Apstein-modified Pelz technique for evaluating laboratories. The technique consists of a series of carefully controlled peer ratings in which a rank order is arrived at by means of a sequence of paired comparisons. Plans for extending these techniques are delineated, and possible applications in industry are evaluated. T.M.

A70-14390 #

THE INFLUENCE OF EFFECTIVE RESEARCH AND DEVELOPMENT ON THE AERO ENGINE BUSINESS.

E. M. Eltis (Rolls-Royce, Ltd., Aero Engine Div., Derby, England). *Royal Society (London), Proceedings, Series A*, vol. 312, no. 1510, Sept. 9, 1969, p. 333-347.

Consideration of the aero engine business as a good example of the growing number of industries whose survival and success depend on their ability to make a success of research. The effect of engine technology on direct operating cost of aircraft is shown, and attention is given to the allocation of research and development funds. It is shown how the applied research activities interact, on the one hand, with the activities in preliminary design, main engine design, development and, eventually, the product improvement phase and, on the other hand, with the more long-term and speculative research activities. Internal communications have been improved by regular training and a policy of job rotation associated with career development. The objective is, by learning to make a real success of research, and by using to their best advantage the extensive science and technical skills and resources available, to achieve a large technical lead.

F.R.L.

A70-14313

ORGANIZATION CONCEPTS FOR AEROSPACE LABORATORIES.

Royal B. Jackman (Northrop Corp., Northrop Norair, Engineering Laboratories, Hawthorne, Calif.). *(Society for Experimental Stress Analysis, Fall Meeting, San Francisco, Calif., Oct. 28-Nov. 1, 1968.)*

Experimental Mechanics, vol. 9, Dec. 1969, p. 23N-27N.

Discussion of the evolution of laboratory work during the development of aerospace systems. Factors affecting laboratory organizations are defined. It is shown that laboratories can be organized in various combinations of technologies, systems, or functions. The most effective organization depends on factors such as company products, size, and personnel capabilities. (Author)

A70-13956

DECISION ANALYSIS IN RESEARCH AND DEVELOPMENT.

Barnard E. Smith (Dartmouth College, Thayer School of Engineering, Hanover, N.H.).

Research Management, vol. 12, Nov. 1969, p. 417-424.

Examination of ways by which newer and more intricate procedures can offer a higher increment of improvement to decisions than is the case with rule-of-thumb procedures. The problems of discounting risk and selecting the approximate measure of value are considered. It is pointed out that a project does not stand by itself, but rather along with other research projects and other investments.

F.R.L.

A70-12991

A STUDY OF A DECISION MODEL FOR R & D PROJECT SELECTION.

D. J. Williams (British Aircraft Corp., Ltd., London, England).

Operational Research Quarterly, vol. 20, Sept. 1969, p. 361-373. 14 refs.

Study of the evaluation and selection of British Aircraft Corporation company-funded R&D projects. After identifying the objectives and selection criteria used by the decision-makers involved in the selection process, an attempt was made to establish the relative importance of and interactions between the various factors, with a view to deriving a model based on a project scoring system using a weighted sum of factor scores. However, analysis of the results obtained showed that each decision-maker had a different perception of the relevance and importance of the various factors to the objectives, so that insufficient data were obtained to achieve a fully representative model. It was shown that for such a model to usefully represent the real situation the interdependence of the selection criteria and objectives must be explicitly established. (Author)

A70-12634

AN ANALYTICAL APPROACH TO SCORING MODEL DESIGN—

APPLICATION TO RESEARCH AND DEVELOPMENT PROJECT SELECTION.

John R. Moore, Jr. (Stanford University, Graduate School of Business, Stanford, Calif.) and Norman R. Baker (Georgia Institute of Technology, Atlanta, Ga.).

IEEE Transactions on Engineering Management, vol. EM-16, Aug. 1969, p. 90-98. 14 refs.

Discussion of the inadequacy of standard multiple-criteria scoring models in providing a decision maker with a method of effectively evaluating competing R&D project proposals. A more effective analytical form of scoring model free of the existing limitations is suggested. An analytical method of model design and verification is discussed, covering the following points: (1) selection of evaluation criteria, (2) development of performance measures, (3) quantification of the research environment, (4) determination of criteria weights, (5) initial model specification, (6) selection of model objectives, (7) initial model verification, and (8) complete model specification and verification.

V.Z.

A70-12306

EFFECTIVENESS IN R & D.

Aeronautical Journal, vol. 73, Sept. 1969, p. 734-739.

Evaluation of the effectiveness of the R&D effort conducted in the field of aeronautics, excluding space and missiles, in the UK. It is found that the UK has fallen behind its competitors in technology in the high-speed military field and is falling behind in the subsonic civil field. This is due not to an absence of ideas or money, but to failure to acquire, by proof of concept experimental activity, the building blocks necessary for the planning of competitive production aircraft. There is no British national effort to set aims and targets in aeronautics, nor does any attempt appear to be made to define and carry out programs demonstrating the required advance in performance at an acceptable cost.

G.R.

M4 MANAGEMENT TOOLS & TECHNIQUES

A70-45866

Cost/design performance management. R. E. Carroll (North American Rockwell Corp., Space Div., Downey, Calif.). *Society of Automotive Engineers, National Aeronautic and Space Engineering and Manufacturing Meeting, Los Angeles, Calif., Oct. 5-9, 1970, Paper 700772*. 9 p. Members, \$1.00; nonmembers, \$1.50.

Description of a system of cost/design performance management. This system ensures that cost is given primary consideration in all design activities during the system-definition phase of large, complex aerospace programs. The overall goal of the definition phase is the establishment of a configuration, an operational concept, and a program plan which will produce an economical product. Meeting this goal demands the accurate and timely estimating of resources and a broad analysis of cost-effectiveness. But of even more importance is the need for vigorous cost reduction and avoidance activity throughout the study. The key to cost reduction is the motivation of program personnel. This is accomplished by assigning them specific cost objectives, integrating cost into the system/program-definition process, and defining trade study decision criteria that are compatible with the cost objectives. The system is further disciplined by tying management into the loop and providing traceable study results, so that all approved decisions are documented in the appropriate specifications and plans.

M.M.

A70-40913

Five ways to bridge the gap between R and D and production. R. F. Moore (National Cash Register Co., Dayton, Ohio). *Research Management*, vol. 13, Sept. 1970, p. 367-373.

Discussion of the 'translation gap' - i.e., the early production phase through which every new development must pass on its way to

becoming a product reality - and of how the gap can be overcome. The gap is shown to occur in various degrees in every organization at the point where product or process designs are transmitted to the manufacturing organization for reduction-to-practice on a production basis. The reasons for the gap are examined and discussed. It is suggested that there are certain generic elements that can minimize the product translation difficulties, the relative importance of which, of course, varies with the particular company environment. These basic factors are: significantly improved communications; broader use of EDP systems in production operations; establishment of a group specifically devoted to bridging the translation gap, expanded use of the product or process manager concept within production areas; and technical upgrading of production personnel specifically at the research and development interface. O.H.

A70-40368 **Weight/cost systems engineering.** L. M. McKay and L. E. Smith (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). *Society of Aeronautical Weight Engineers, Annual Conference, 29th, Washington, D.C., May 4-6, 1970, Paper 866.* 21 p. \$36. per set of 36.

Development of a cost control and analysis procedure and its interface with weight control and analysis, with discussion of how many weight analysis techniques have been adapted for use in cost analysis. One of the major problems of the cost analyst is the lack of a large historical data bank. The establishment of a standard reporting procedure for both weights and costs such as the Work Breakdown Structure, defined by NASA, is a major step forward in defining a common base for reporting of weight-and-performance cost, and resource requirements during future programs. F.R.L.

A70-40352 **Management of design by critical element objectives.** Robert L. Crouse (Honeywell, Inc., Minneapolis, Minn.). *Society of Aeronautical Weight Engineers, Annual Conference, 29th, Washington, D.C., May 4-6, 1970, Paper 868.* 8 p. \$36. per set of 36.

Discussion of the critical elements of the design cycle in systems and equipment, as well as the needs and ways to assign priorities to the critical element objectives in the design cycle. The basic theme is the cooperative activities and objectives of six current engineering specialists in the production environment: the design performance engineer, the production engineer, the reliability and quality engineer, the configuration and/or packaging engineer, the cost and value engineer, and the weight engineer. F.R.L.

A70-38620 **Project economic evaluation.** P. A. Norman (Rolls-Royce, Ltd., Small Engine Div., Leavesden, Herts., England). (*Royal Aeronautical Society, All-Day Symposium on Value for Money, London, England, Apr. 1, 1968.*) *Aeronautical Journal*, vol. 74, July 1970, p. 613-617.

Discussion of one important aspect of the process that takes place between completion of recommendations from Market Research and the setting up and control process in Value Analysis. A flow chart is presented showing the interrelation between technical, manufacturing and economic appraisals. The involvement of various functions at each stage of economic evaluation is examined, and a Return on Assets Employed technique is discussed. The influence of company and project factors on economic standards is investigated. G.R.

A70-38619 **Value engineering - A challenge to management.** L. W. Crum (Rolls-Royce, Ltd., Aero Engine Div., Derby, England). (*Royal Aeronautical Society, All-Day Symposium on Value for Money, London, England, Apr. 1, 1968.*) *Aeronautical Journal*, vol. 74, July 1970, p. 608-613. 11 refs.

Discussion of a proposal for a total value engineering effort from concept to service working to improve the competitive position of

the British aerospace industry. Basic objectives and techniques of value engineering are examined, problems of implementation are considered and organizational aspects are investigated. Essential requirements which management must provide are analyzed. G.R.

A70-38402 # **Past and future of cost effectiveness - Actions needed to improve applicability.** George W. Morgenthaler (Martin Marietta Corp., Denver, Colo.). *Logistics Spectrum*, vol. 4, Spring 1970, p. 9-16, 29-31. 69 refs.

Discussion of cost-effectiveness, its scope, methodology, and applications giving particular attention to future developments. Problems which have to be investigated on the basis of the criteria of cost-effectiveness are discussed taking into consideration various areas of applications related to the space program, other government and civic agencies, industry, and the military sector. New developments in operations research are considered, and future data needs and the qualifications of future practitioners are discussed. G.R.

A70-35297 **The system approach in resource allocation examples and some observations.** Leo Steg (GE Valley Forge Space Technology Center, Philadelphia, Pa.). In: *International Symposium on Space Technology and Science*, 8th, Tokyo, Japan, August 25-30, 1969, Proceedings. Edited by Akira Takano. Tokyo, AGNE Publishing, Inc., 1969, p. 983-989.

Discussion of systems analysis, an orderly process of examining all facets of a problem to arrive at a preferred solution. Most of the basic steps are as follows: (1) an analysis is made of the future environment in which the system must operate. From the environment study it is possible to state the mission or missions which the system is expected to accomplish; (2) having determined the mission, systems which could perform the mission are postulated; (3) a measure of effectiveness must be determined so that we can obtain an indication of how well the alternative systems are performing relative to each other, with respect to the specified mission; and (4) sensitivity analyses must be performed to account for the uncertainties in estimation of what the future environment might be like to account for uncertainties in the estimates of the way in which the alternative systems will, in fact, perform within these environments. An example is presented in which the application lies in areas in which the limiting assumptions lie in sociological and educational considerations. M.M.

A70-33427 **Program risk assessment.** A. C. Haggerty (Boeing Co., Vertol Div., Philadelphia, Pa.). In: *NAECON '70; Institute of Electrical and Electronics Engineers, National Aerospace Electronics Conference*, Dayton, Ohio, May 18-20, 1970, Proceedings. Dayton, Ohio, Institute of Electrical and Electronics Engineers, Inc., 1970, p. 27-30.

Within the last several years there has been a growing awareness in both the government and industry that a formalized risk analysis is a prerequisite to the initiation of a major new program. Recognition that there is a need for a logical and documented approach to developing an overall program plan is the first step in risk assessment. With a documented approach, the assumptions under which decisions are made can be kept in mind, and thus decisions can be measured and altered as the decision-making process continues. The factors to be considered when developing a program risk analysis will be discussed, including the comparison of the proposed system with a low- or no-risk baseline, the identification of critical or high-risk areas, and the estimation of the probability of achieving the desired system objectives. In addition, the concept of risk management will be discussed, including the development of contingency plans, parallel developments, and performance measurement systems. (Author)

A70-32207 # **Systems approach to accident investigation.** C. O. Miller (U.S. Department of Transportation, Bureau of Aviation

Safety, Washington, D.C.). In: Flight Safety Foundation, Annual International Air Safety Seminar, 22nd, Montreux, Switzerland, October 27-31, 1969, Proceedings. Arlington, Va., Flight Safety Foundation, Inc., 1969. 23 p. 9 refs.

General discussion of various aspects of air accident investigations with special attention to the systems approach in accident prevention and inquiry processes. The present situation is analyzed and possible changes in future approaches to the accident prevention process are outlined. The modern systems management methodology and philosophy are described.

V.Z.

A70-31574 Forecasting and decision making. Kaiomars P. Anklesaria (National Cash Register Co., Dayton, Ohio). *IEEE Transactions on Engineering Management*, vol. EM-17, May 1970, p. 74-77. 7 refs.

Analysis of the complexities of the interaction between forecasting and the management decision-making process. The necessity of forecasting is examined. Forecasting and its relationship to the interactive environmental elements are discussed. Limitations of forecasts are pointed out and problems of forecast evaluation and use are investigated.

G.R.

A70-31104 QC's role in configuration management. C. O. Penn (Lockheed-Georgia Co., Marietta, Ga.). In: American Society for Quality Control, Annual Technical Conference, 24th, Pittsburgh, Pa., May 11-13, 1970, Transactions. Milwaukee, Wis., American Society for Quality Control, Inc., 1970, p. 129-131.

Discussion of the quality control role in configuration management taking into consideration the quality-assurance organization of an aircraft building company. It is stated that this organization has done an excellent job resulting from quality control practice of adopting an unbiased and objective viewpoint in making specific comparisons between specifications, design approach, design drawing and hardware. That ability and training which quality control personnel normally must possess, makes the configuration management task achievable in a very efficient manner.

Z.W.

A70-29687 The man-machine interface in automated testing. K. Brewster (Elliott Flight Automation, Ltd., Rochester, Kent, England). In: Institution of Electronic and Radio Engineers, Joint Conference on Automatic Test Systems, University of Birmingham, Birmingham, England, April 14-17, 1970, Proceedings.

Conference co-sponsored by the United Kingdom Automation Council. London, Institution of Electronic and Radio Engineers, 1970, p. 211-220.

Discussion of the design features of automatic test equipment relating to the operator's use of the equipment. Important features are highlighted by reference to recent experience. It is pointed out that, in attempting to provide an improved interface between operator and automatic testing equipment (ATE), a major difficulty lies in the justification of the extra cost of a good ergonomic design. While improved equipment layout undoubtedly reduces operator fatigue, there are little data available on which one can base a quantitative cost saving figure. Thus the ATE manufacturer who does give due attention to human factors in his design may be penalized when capital cost is so often all important.

M.M.

A70-29568 The effect of value engineering on system reliability. Martin T. Pett (Hughes Aircraft Co., Missile Systems Div., Canoga Park, Calif.). In: System reliability and effectiveness; American Society for Quality Control, Annual West Coast Reliability Symposium, 10th, Beverly Hills, Calif., February 21, 1969, Proceedings. North Hollywood, Calif., Western Periodicals Co., 1969, p. 65-71.

Discussion of the beneficial and detrimental effects of value engineering change proposals on equipment reliability. The value

engineering effort results in the submittal of change proposals which result in a reduction of target cost with a simultaneous increase in target profit. The usual requirement is that equipment performance (including reliability) be not degraded as a result of the change. Changes which are likely to improve reliability are those with the following features: (1) reduction in parts count, (2) reduction in power consumption, (3) improved accessibility and testability, (4) reduction in the number and complexity of manufacturing operations, and (5) improvement in marginal design parameters. Changes which are likely to degrade reliability feature (1) relaxation of part testing and quality screening, (2) use of high-risk state-of-the-art techniques, and (3) arbitrary relaxation of specification tolerances.

T.M.

A70-27447 Cost effective avionics technology for the 1970's. Robert M. Richardson and Lee C. Keene (ITT Navigator Systems, Inc., Rockville, Md.). *Society of Automotive Engineers, National Air Transportation Meeting, New York, N.Y., Apr. 20-23, 1970, Paper 700299*. 7 p. Members, \$1.00; nonmembers, \$1.50.

Study of cost effectiveness in avionics technology, and how it will affect the airlines and industry. On an overall basis, cost effectiveness is synonymous with success. Three specific categories are explored: technology, systems engineering, and specifications. Cost effectiveness to the airlines can be interpreted as absolute minimal downtime, whereas its effectiveness as applied to avionics manufacturers will mean cost reduction while maintaining a high degree of accuracy and reliability.

F.R.L.

A70-23418 Testing TORQUE—A quantitative R&D resource-allocation system. Ambrose Ben Nutt (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio). ('69 NAECON; Institute of Electrical and Electronics Engineers, National Aerospace Electronics Conference, 21st, Dayton, Ohio, May 19-21, 1969, Proceedings, p. 513-518.) *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 243-248.

Description of a rational method of allocating and justifying the allocation of resources in an organization. The genesis and operation of the system are reviewed, together with the results and some of its implications, insofar as they affect R&D.

V.P.M.

A70-23417 Cost effectiveness in R&D organizational resource allocation. Burton V. Dean (Case-Western-Reserve University, Cleveland, Ohio) and Lewis A. Roepcke (U.S. Army, Technical Planning Branch, Washington, D.C.). *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 222-242. 21 refs. Grant No. DA-ARO(D)-31-124-G-1034.

A method for use in allocating resources to a multilaboratory, multitask research and exploratory program is described. The basic elements of the underlying model are (1) tasks, projects, and laboratories, (2) contributing sciences and technologies (S and T), (3) criticality of such fields to achieving organizational objectives, (4) relative values of objectives, and (5) costs of performing tasks. Structural models are developed for interrelating tasks, S and T fields, and objectives. A cost-effectiveness model is developed for use in allocating resources to tasks. Research and exploratory development effectiveness is measured in terms of the value of task contribution to organizational objectives. Results of this study tested by experimentally determined inputs include (1) cost-effectiveness relationships for tasks, projects, laboratories, and S and T fields, (2) log-normal distributions for both project cost and effectiveness, and (3) a systematic procedure for allocating resources to R&D activities.

(Author)

A70-23416 Technological forecasting in a dynamic environment. Marvin J. Cetron (U.S. Naval Material Command, Exploratory Development Div., Washington, D.C.) and Jacob N. Johnson (Synergistic Cybernetics, Inc., Alexandria, Va.). *IEEE*

Transactions on Engineering Management, vol. EM-16, Nov. 1969, p. 190-222. 64 refs.

Government and industry are developing many new ways to forecast future technical developments, but the payoff comes when these projections are incorporated as part of the R&D planning process. This is done on two levels—when deciding on future work in a specific development project and when assigning priorities to the overall R&D effort. Systems being developed in industry and in the federal government are able to integrate technological forecasts with data on future needs, probabilities of success, and potential funding levels. The computerized result is a complete ranking of all on-going and potential projects according to their overall worth. But care must be taken to ensure that the computer printout retains its role as a servant and not a ruler of managers. One of many normative (goal-oriented) technological forecasting techniques currently being examined will be discussed in this paper. It is hoped that this technique will serve two interrelated purposes: (1) to explore the structure of project-selection decision problems in the context of the information and organization environment of the R&D manager and (2) to explore characteristics of the R&D process that are relevant to the design and implementation of management system for planning and controlling resource allocation among various R&D projects.

(Author)

A70-23415 Research project cost distributions and budget forecasting. Burton V. Dean (Case-Western Reserve University, Cleveland, Ohio), Samuel J. Mantel, Jr. (Cincinnati, University, Cincinnati, Ohio), and Lewis A. Roepcke (U.S. Army, Technical Planning Branch, Washington, D.C.). *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 176-189.

The purpose of this paper is to determine the nature of actual research project costs, their probability distributions, and corresponding parameter values so that long-range budget forecasts and variances can be provided. The distribution and parameters of the research project costs for 1963 through 1967 have been developed and are discussed. A description of the present Army budgeting system is presented. The budget forecasting problem is defined and a mathematical model is presented. The essential elements of the model are described in terms of parameters and coefficients, which are obtained from the 1963 through 1967 budget data. Four variations of the basic model are developed and compared. This paper contains a list of computer program statements specifically designed (1) to derive the necessary parameters from historical data, and (2) to forecast these parameters for each of five years into the future. The program, its operation, and features are discussed with sample outputs provided for illustration purposes.

(Author)

A70-23413 Technological forecasting—Practical problems and pitfalls. Marvin J. Cetron (U.S. Naval Material Command, Exploratory Development Div., Washington, D.C.) and Donald N. Dick (U.S. Navy, Naval Ordnance Laboratory, White Oak, Md.). (*European Business*, Apr. 1969.) *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 161-172. 9 refs.

Technological forecasting is becoming a widespread activity in business and the military. The actual accomplishment of the forecasting task is increasing in methodological sophistication. This article presents many practical problems and pitfalls encountered in planning and preparing technological forecasts. The authors examine the factors to be considered in the initial stages of implementing forecasts, the validity of previous forecasts, summarize recent advances, point out new hazards, evaluate the forecasting technique, and include some realistic suggestions for improved technological forecasts.

(Author)

A70-23412 Relating organization goals and technological forecasting for research and development resource allocation. C. M. Schoman, Jr., D. N. Dick, and T. R. McKnight (U.S. Navy, Naval

Ordnance Laboratory, Silver Spring, Md.). *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 148-161. 12 refs.

This paper discusses a simple and logical method for using Navy Exploratory Development Goals (EDG) and the Navy Technological Forecast (NTF) for the allocation of resources to technology to meet future requirements. First, the military worth of the various EDG in meeting Navy objectives is determined. Second, the utility of the various technologies to the EDG is determined by systems design and scientific/engineering offices. The military worth and technology utilization values are then combined into an Index of Worth value indicating the worth of the various technologies in meeting Navy objectives. A mathematical model is suggested as a future refinement.

(Author)

A70-23024 # Application of computer aided design programs for the technical management of complex fighter development projects. W. B. Herbst and H. G. Ross (McDonnell Douglas Corp., Engineering Technology Div., St. Louis, Mo.). *American Institute of Aeronautics and Astronautics, Fighter Aircraft Conference, St. Louis, Mo., Mar. 5-7, 1970, Paper 70-364*. 11 p. 10 refs. Members, \$1.00; nonmembers, \$1.50.

A computerized approach to technical management of fighter development programs is described. A design synthesis program for concept formulation evolved through a design monitoring and trade-off evaluation program for contract definition into the major part of a project-wide management information system for hardware acquisition. The submodules and capabilities are briefly described after review of the overall objectives in these three development phases. The iterative nature of the design and evaluation process is described and the computer program is interpreted as a management tool to force this iteration to converge into a product which is optimum with respect to design and development objectives. Emphasis is placed on the practical implementation and operational problems which have been encountered. The advantages of this approach are discussed.

(Author)

A70-21038 The management organisation of the Martel project. P. R. Franks (Hawker Siddeley Dynamics, Ltd., Hatfield, Herts., England). (*Royal Aeronautical Society, All-Day Symposium, London, England, Feb. 19, 1969*.) *Aeronautical Journal*, vol. 74, Jan. 1970, p. 81-84.

Discussion of the management arrangements associated with the French-British Martel (Missile Antiradar et Television) project. Major attention is given to the tasks of the government agencies and main contractors involved. It is concluded that it is possible to achieve a successful management organization for an international project by overlaying the different national organizations with an appropriate committee structure.

F.R.L.

A70-21037 Project management techniques of Rapier. G. E. King (British Aircraft Corp., Ltd., Stevenage, Herts., England). (*Royal Aeronautical Society, All-Day Symposium, London, England, Feb. 19, 1969*.) *Aeronautical Journal*, vol. 74, Jan. 1970, p. 75-81.

Review of some of the British Aircraft Corporation's experiences in applying guided weapons (GW) management techniques to the Rapier light weight antiaircraft weapon system. The management problem is defined, and the BAC organization is described. An effective PERT system is used, balanced by an all-embracing design review. Aspects of the communication problem are considered.

F.R.L.

A70-21036 Sea Dart. G. W. Bridle (Ministry of Technology, London, England). (*Royal Aeronautical Society, All-Day Symposium, London, England, Feb. 19, 1969*.) *Aeronautical Journal*, vol. 74, Jan. 1970, p. 69-75.

Review of the machinery used for the management of the

development of the Sea Dart missile. The managerial concepts pioneered by Henri Fayol are used to cover the relevant area. Fayol suggested that management activity is made up of five parts: planning, organizing, commanding, coordinating, and controlling. It is considered that the dynamics of cost growth are still worthy of study. F.R.L.

A70-20603 # Optimal spares for stochastically failing equipment. Charles H. Falkner (Wisconsin, University, Madison, Wis.). *Naval Research Logistics Quarterly*, vol. 16, Sept. 1969, p. 287-295. 7 refs.

A mathematical model is formulated for determining the number of spare components to purchase when components stochastically fail according to a known life distribution function and there is a cost incurred when a component is replaced. Bounds are determined for the optimal inventory which indicate that the inclusion of the replacement cost lowers the optimal inventory. Since these bounds are no easier to calculate than the optimal spares level, the theory is specialized to components with exponentially distributed time to failure. Procedures are given for calculating the optimal spares level, and numerical examples are provided. (Author)

A70-19673 MAC'S ISOCHRONAL CONCEPT—A MAINTENANCE MANAGEMENT TOOL.

Russell L. Bush (USAF, Washington, D.C.).

Defense Management Journal, vol. 5, Fall 1969, p. 27-31.

Discussion of the Isochronal Inspection system of the Military Airlift Command which has the objective to bring airlift force productivity to its maximum limits. The origin of the isochronal concept is considered and the principles of the system are discussed. It is pointed out that the management actions described have made it possible to utilize the C-141 at the intensive rate of 8 hrs a day since its introduction into the Military Airlift Command. G.R.

A70-16461 # IMPLEMENTATION OF C/SPCS AT RESD WITHIN A FUNCTIONAL ORGANIZATION.

Alexander Lengyel (General Electric Co., Re-Entry and Environmental Systems Div., Philadelphia, Pa.).

Aerospace Management, vol. 4, no. 2, 1969, p. 27-37.

Description of the Cost/Schedule Planning and Control System (C/SPCS). The system provides early exposure of inadequacies in initial planning of work or during its execution. It accomplishes this through cost and schedule performance measurement implemented by a number of specific functional procedures and associated documentation based on a clearly identified and coherent work-breakdown structure. An outstanding feature of the system is that it calls for accurate planning before there can be any implementation. When applied by enlightened management as a tool for highlighting contract-work or program performance, it becomes a powerful aid for effective management. Full and effective use of the system does require, however, that the manager have the willingness, and the attendant maturity, to document his work so that both his successes and his shortcomings become highly visible. M.V.E.

A70-16451 COMPUTER GRAPHICS FOR DECISION MAKING.

Irvin M. Miller (IBM Corp., Systems Development Div., Poughkeepsie, N.Y.).

Harvard Business Review, vol. 47, Nov.-Dec. 1969, p. 121-132.

Description of a new technique for decision making, involving the use of a computer display screen which makes it possible to operate graphs representing business decisions. The salient points of the graphic technique are described, and step-by-step illustrations are used for demonstrating how an executive can solve problems and analyze decisions by computer graphics. Special attention is given to

the importance of privacy and the use of intuition to cross-examine and verify an executive's own predictions. The special features of the display system are outlined, and a discussion is presented of the function and respective merits of standard electronic aids such as typewriter-printers, alphanumeric displays, and plotters. Suggestions for developing programs and software requirements are given along with estimates of the size of the system needed. Z.W.

A70-14833 # INTERACTION OF PROCUREMENT DECISION IN WEAPON SYSTEM ACQUISITION PROJECTS.

George R. Hall (RAND Corp., Santa Monica, Calif.).

American Society of Mechanical Engineers, Winter Annual Meeting, Los Angeles, Calif., Nov. 16-20, 1969, Paper 69-WA/Mgt-6. 7 p.

Members, \$1.00; nonmembers, \$2.00.

System acquisition programs can be divided into stages separated by points where major decisions or sets of decisions are made. Specific sequences of procurement decisions are referred to here as a procurement strategy. Various different procurement strategies applied to systems acquisition programs are examined and their merits, limitations, and conditions for application are outlined. Selection of a strategy based on the specific characteristics of each separate program is discussed. In particular, the need to evaluate the costs and benefits associated with each specific application of the alternative strategies is emphasized. (Author)

A70-14051 * THE PROCESS OF PROBLEM FINDING.

William F. Pounds (Massachusetts Institute of Technology, Alfred P. Sloan School of Management, Cambridge, Mass.).

Industrial Management Review, vol. 11, Fall 1969, p. 1-19. 10 refs. NASA-supported research.

Investigation of current managerial practices of problem identification. Though essential to problem priority assignment and to prudent resource allocation, the identification process has as yet at its disposal no implementation means comparable to the highly effective analytical techniques currently available for the solution of management problems. A detailed study—suggested by the methods and findings of chess computerization research—was carried out on 50 successful managers in a decentralized operating division of a large corporation with the aim of finding out how these executives went about finding and defining their problems. It was also endeavored to determine the simplest theoretical structure apt to describe these executives' problem definition process in terms of managerial model varieties. The initial insights provided by this study, though leaving considerable theoretical gaps, are felt to represent an encouraging start at understanding an important and little understood area of management. M.V.E.

A70-12899 TOTAL AIRLINE PROFIT MODEL PROGRAM.

R. B. Ormsby (Lockheed Aircraft Corp., Lockheed-Georgia Co., Marietta, Ga.).

Society of Automotive Engineers, National Air Transportation Meeting, New York, N.Y., Apr. 21-24, 1969, Paper 690413. 12 p.

Members, \$1.00; nonmembers, \$1.50.

Description of Lockheed's incremental profit model and total airline profit model programs for air-cargo systems. The first program measures the incremental effect on airline profit of specific design changes in the airplane and/or in its support elements and provides insights into the relative importance of each performance and cost element of the system. The second program gives a comprehensive definition of the complete system, identifies the associated cost elements, and provides the capability of optimizing the system for best economic operation. Presently, substantial assumptions and estimated values are being used for many of the input elements to the models. As more realistic values and cost data become known

they will replace the original assumed and estimated values. Thus, on a continuing basis, model outputs with ever increasing validity may be expected. M.V.E.

A70-12898**PASSENGER AIRPLANE ECONOMICS AND SYSTEMS APPLICATION CONSIDERATIONS FOR AIRLINE OPERATIONS.**

Robert A. Taylor (Boeing Co., Seattle, Wash.).

Society of Automotive Engineers, National Air Transportation Meeting, New York, N.Y., Apr. 21-24, 1969, Paper 690415. 15 p.

Members, \$1.00; nonmembers, \$1.50.

Description of Boeing's computer-supported airline fleet planning methodology, reflecting both the market environment and the airline management's view of it. Under the described procedures, any aircraft types can be checked out realistically against various forecasted situations, and sound estimates of return on investment for carefully planned fleets of given equipment types are obtainable. Changes in routing and scheduling tactics can be checked out quickly, and the effects of oncoming equipment innovation can be carefully studied. The time needed for preparatory planning and research, meetings with airlines, organizing and inputting material, and analyzing the results, in other words, the entire study of a trunk airline system, is estimated at only three months. M.V.E.

A70-12787**THE CONCEPT OF THE BEST SCHEDULE.**

Gordon C. Shaw (York University, Faculty of Administrative Studies, Toronto, Canada).

Operations Research Society of America, National Meeting, 36th, Miami Beach, Fla., Nov. 10-12, 1969, Paper. 32 p.

Development of the concept of the best schedule of N flights, defined as the "best day pair schedule" or as the "best weekly leg schedule." Calculation of the best schedule on the basis of a decision making model shows that the airline industry will attract a relatively large proportion of the potential gross revenue for a network leg by operating a relatively few flights, provided that the departure times of these flights approximate those of the relative best schedule. This applies to even a short-haul network. For example, five flights, scheduled to depart daily at approximately 0700-0800, 1100, 1400-1500, 1700-1800, and 1900-2000 hours, should attract at least 90 per cent of the potential gross revenue of that leg. Only marginal improvements should be expected in the foregoing percentage as the number of flights exceeds five. V.P.

A70-11674 #**A COST MODEL FOR EVALUATION OF SYSTEM AVAILABILITY.**

A. W. Wortham and R. L. Street (Texas Agricultural and Mechanical University, College Station, Tex.).

Logistics Spectrum, vol. 3, Fall 1969, p. 27-30.

Contract No. N 00014-68-A-0140.

Discussion of the effect of availability variations on system total cost and the interrelationship of maintainability and reliability efforts for decision making. It is pointed out that the total cost of a system can be regarded as composed of two elements. These elements are initial costs (for design and development) and support costs. The two elements are brought together, using an index of availability. By doing this, it is possible to construct a cost model which can be optimized. In this way, light can be shed on the relative emphasis or importance of the elements. G.R.

A70-11673 #**COST EFFECTIVENESS ANALYSIS.**

Ben S. Blanchard (General Dynamics Corp., Electronics Div., Rochester, N.Y.).

Logistics Spectrum, vol. 3, Fall 1969, p. 19-26, 30.

Discussion of an approach to cost-effectiveness analysis which is applicable to the selection and acquisition of any DOD-military system. Basic concepts of cost effectiveness are briefly reviewed. The procedural approach required in completing a cost-effectiveness analysis is shown in a graph. Basic operational requirements are considered, and the development of a cost-effectiveness model is discussed. The approach proposed is illustrated in a case study. The case involves an airborne electronics subsystem. System requirements are evaluated, the system life-cycle is analyzed, and the overall effectiveness in terms of cost is measured. G.R.

A70-10488 #**A METHOD FOR AUTOMATICALLY SELECTING OPTIMUM REDUNDANCY.**

W. H. Widawsky (McDonnell Douglas Corp., McDonnell Douglas Astronautics Co., Western Div., Huntington Beach, Calif.).

Operations Research Society of America, National Meeting, 36th, Miami Beach, Fla., Nov. 10-12, 1969, Paper. 23 p. 5 refs.

(MDAC-WD-1017)

Description of a recently developed computer program, H744, which aids in selecting redundant parts and their redundancy types. The program calculates the impact of active, standby, and storage redundancy for each component on various gross system characteristics, such as probability of no system loss, total number of system failures, maintenance time, weight, volume, and recurring cost. Then, based upon a predetermined selection criterion, the program automatically ranks redundancy parts and their redundancy type until a particular constraint or goal is reached. The program input utilizes component characteristics such as failure rates, failure modes, environmental stress factors, maintenance times, weights, volumes, and cost. Certain system or mission characteristics are also used as input and include operating time, nonoperating time, and a number of initial components. The program output is a preferential ranking of redundant components and their redundancy types based on a predetermined selection criterion. O.H.

M5 PERSONNEL MANAGEMENT**A70-41174**

Effective assignment of engineers. Daniel Harwood (Sylvania Electronic Products, Inc., Communication Systems Div., Needham Heights, Mass.). *IEEE Transactions on Engineering Management*, vol. EM-17, Aug. 1970, p. 106-108.

This paper discloses some 'rules of thumb' developed by the author in order to better assign engineering talent to small R and D programs. The philosophy to support the empirically derived equations is covered in the paper. A case history to demonstrate the efficacy of the rules of thumb is discussed. (Author)

A70-35298

A systems approach to comparison by emphasis. Clarence E. Caveness. In: *International Symposium on Space Technology and Science*, 8th, Tokyo, Japan, August 25-30, 1969, Proceedings. Edited by Akira Takano. Tokyo, AGNE Publishing, Inc., 1969, p. 991-996. 9 refs.

Because space technology and its research have become increasingly complex, it is necessary to rely on clever marshalling and application of resources to ensure superiority in materials and brain power. The paper reports on the application of systems engineering in an empirical exploration of evaluation and rewarding top scientific and engineering personnel in respect to their performance. This one report of a series of studies is directed at discovering how the performance of exceptional individuals can be conceptualized and measured as to his worth to the supervisor, to a research program, and to the aero-space oriented company. The employment of systems engineering to personnel rating develops a comparison by emphasis curve. Two diagrams and one table are included. (Author)

A70-32629 **The human element in system development.**
 Alan D. Swain (Sandia Laboratories, Albuquerque, N. Mex.). In: Institute of Electrical and Electronics Engineers, Annual Symposium on Reliability, Los Angeles, Calif., February 3-5, 1970, Proceedings. Symposium co-sponsored by the Institute of Environmental Sciences, the American Society for Nondestructive Testing, and the American Society for Quality Control. New York, Institute of Electrical and Electronics Engineers, Inc. (Annals of Assurance Sciences. Volume 3, No. 1), 1970, p. 20-28. 18 refs. AEC-supported research.

Description of the program and procedures indicating the type of approach necessary to fully consider the human element in system development. It is shown that appropriate consideration of the human element in all stages of system development is necessary to achieve optimum tradeoffs among system reliability, cost, and other system criteria. Formal planning for this consideration can reduce the tendency to allocate system functions to automatic equipment when a more effective allocation would make greater use of manual means. Formal consideration of the human element includes the application of human factors technology to increase human reliability in a system. Where possible, human reliability analyses should be performed to obtain estimates of human error rates for inclusion in system reliability studies and to evaluate recommended design changes. O.H.

A70-26607 **Pilot selection and leadership.** Edward Stephenson. *Flight International*, vol. 97, Apr. 2, 1970, p. 555-558.

Discussion of the importance of the qualities of leadership as criteria for selecting pilots. Training recommendations for the training of airline pilots are considered. It is found that the capability as commander of aircraft and crew requires considerable qualities of leadership. Questions of the nature of command are examined and representative command qualities for aircraft commanders are listed. The differing aspects of preparing people for leadership in the Services and in civil flying operations are discussed. G.R.

A70-19002
HIRING CORPORATE SCIENTISTS—THE TEAM APPROACH.
 Sami Kassem (Toledo, University, Toledo, Ohio).

Research Management, vol. 13, Jan. 1970, p. 45-54. 6 refs.
 Discussion of the emerging trend of team hiring of research scientists by industrial and academic organizations. The background of the trend is traced, some evidence for its prevalence is provided, speculations are made on its possible causes, and its implications for both the management and design of R&D organization are suggested. M.M.

A70-18799
AEROSPACE NOMADS—HOW PROFESSIONALS MOVE.
 Richard P. Howell (New Management Center, Palo Alto, Calif.).
IEEE Spectrum, vol. 7, Jan. 1970, p. 32-41. 14 refs.

Investigation of the movement of over 40,000 scientists and engineers at work in six geographical areas and in high-technology industry. This study attempts to answer the question where the technical professional work force could be obtained if it became necessary to locate a large high-technology defense facility in some unexpected location. Data collected in pursuit of the answer made possible the development of several inferences bearing upon the movement of this technical, intellectual resource between geographical areas and employers. After describing briefly the source and processing of the data, the derived inferences and findings are presented and discussed. M.V.E.

A70-14316
MANAGEMENT FACTORS IN REDUCING ATCS STRESS.
 John T. Dailey (Federal Aviation Administration, Office of Aviation Medicine, Washington, D.C.).
(International Symposium on Air Traffic Control, Stockholm,

Sweden, Mar. 1969.)

Journal of Air Traffic Control, vol. 11, Nov. 1969, p. 26-30.

Discussion of the human factors affecting the rated capacity of an air traffic control system. Levels of safe productivity of air traffic control teams could be raised and the optimal productive career duration of air traffic controllers lengthened by changes in personnel management practices conducive to minimization and equalization of the stresses imposed on controllers. Short- and long-range recommendations regarding such changes in management practices are presented. M.V.E.

A70-12379 #
EXPERIENCE AND PRIOR PROBABILITY IN A COMPLEX DECISION TASK.

Michael H. Strub (Ohio State University, Human Performance Center, Columbus, Ohio).
Journal of Applied Psychology, vol. 53, Apr. 1969, pt. 1, p. 112-117. 17 refs.
 Contract No. AF 33(615)-2248.

Six experienced and six naive subjects evaluated probabilistic data, determined sources of data generation, and predicted subsequent data in a complex decision task. Experience and prior probability were combined factorially. Results indicated that experienced subjects (1) were less conservative data evaluators, (2) determined data sources on the basis of fewer data samples, (3) were more sensitive to prior-probability values, and (4) adopted a maximization strategy in prediction more consistently than did naive subjects. The importance of using trained personnel in the evaluation of realistic decision capabilities and the need for caution in generalizing from data obtained from naive subjects who serve in most laboratory studies of decision making are discussed. (Author)

A70-12378 *
ORGANIZATIONAL FACTORS AND INDIVIDUAL PERFORMANCE—A LONGITUDINAL STUDY.

George F. Farris (Michigan, University, Ann Arbor, Mich.).
Journal of Applied Psychology, vol. 53, Apr. 1969, pt. 1, p. 87-92. 6 refs.
 Grant No. NsG-489-28-014.

Stability of relationships and time lags in measurement were investigated using information collected at two points in time about organizational factors and the performance of 151 engineers. Four measures of performance were correlated with six organizational factors: involvement in work, influence on work goals, colleague contact, diversity of work activities, salary, and number of subordinates. On the basis of low but statistically significant associations, it was found that correlations between organizational factors and performance were generally stable with a six-year interval between measurements. Surprisingly, relationships were consistently stronger when performance was measured before the organizational factor. It was concluded that changes in organizational factors which follow performance should be considered in research design, organizational theory, and, especially, in interpretations of "simultaneous" associations between organizational factors and performance. (Author)

A70-12307
AIR TRANSPORT—THE MANNING OF AN EXPANDING INDUSTRY.

A. M. A. Majendie (Civil Air Transport Industry Training Board, Staines, Middx., England).

Aeronautical Journal, vol. 73, Sept. 1969, p. 741-750. 6 refs.

Discussion of the trained manpower needs of the civil air transport industry in the UK. A short account of the formal constitution of the Civil Air Transport Industry Training Board is presented. The manpower problems facing the industry are analyzed. Particular attention is given to aspects of recruitment and training. The effect of the rate of change of technology on the problems of manpower is discussed. A forecast is given of civil air transport training expenditure during the period from 1968 to 1973. G.R.

A70-10821**PSYCHOLOGICAL ERRORS IN PHOTO-OPTICAL SYSTEMS OF SIMULATION.**

Kiyoe Mizusawa (Pennsylvania State University, University Park, Pa.).

IN: PHOTO-OPTICAL TECHNIQUES IN SIMULATORS; SOCIETY OF PHOTO-OPTICAL INSTRUMENTATION ENGINEERS, SEMINAR-IN-DEPTH, SOUTH FALLSBURG, N.Y., APRIL 28, 29, 1969, PROCEEDINGS.

Seminar co-sponsored by the Simulation Councils.

Redondo Beach, Calif., Society of Photo-optical Instrumentation Engineers (SPIE Seminar Proceedings. Volume 17), 1969, p. 149-153. 18 refs.

Brief discussion of some of the psychological aspects of the sources of unreliability in man-machine systems. Criteria for the selection and training of users of photooptical instruments are discussed. Three major variables affecting the motivational perceptual processes—namely, needs and values, reward and punishment, and personality differences—are discussed.

M.M.

M6 TECHNOLOGICAL RESOURCES

A70-44500 # Bringing NASA's fall-out down to earth. Janet Kotel. *Mechanical Engineering*, vol. 92, Oct. 1970, p. 16-23.

Discussion of the objectives, organization, and achievements of NASA's Technology Utilization Program. This program is shown to be a planned, continuing effort to locate aerospace-related inventions, new scientific knowledge, and technical skills, and to make them available to potential users in the civilian economy. In addition to NASA's Specialized Information Services, provided by six Regional Dissemination Centers set up across the country to prepare current awareness searches, retrospective searches, and standard interest profiles, its overall Technology Utilization Program serves to announce new technology, if deemed to have commercial potentialities, to business and industry. For this purpose, appropriate ways are employed, such as Tech Briefs, TU Compilations, Technology Utilization Reports, Technology Surveys, and abstract journals. Other parts of this program are COSMIC (Computer Software and Management Information Center), Biomedical Application Teams, education enrichment materials, and patents and licenses. Several examples of typical technology transfers, illustrating the efficiency of the program, are presented.

O.H.

A70-41892 # Partnership in major technological projects. George Edwards (British Aircraft Corp., Ltd., London, England). *Aircraft Engineering*, vol. 42, Sept. 1970, p. 59-62, 65, 66.

Discussion of technological partnership between industry and government inside Britain, and partnership between Britain and other countries, with special reference to Europe. In the case of domestic partnership between the British government and British technology, this is only in the national interest if both the country and the industry benefit from it. It is considered that national well-being is conditional on a healthy balance of payments. A major contribution to this comes from large industries with high conversion ratios. The major projects which these industries must produce will be at the frontiers of knowledge, involving large sums of money and great risks, which must be shared in sensible partnership with the government. This partnership can be fruitfully extended to other countries, although a critical examination of the gains and market value of such liaisons must be made.

F.R.L.

A70-38609 Space technology 'spin-off' benefits to mankind. D. A. Wiltshire (Rolls-Royce, Ltd., Bristol Engine Div., Bristol, England). *Aeronautical Journal*, vol. 74, July 1970, p. 533-538.

Discussion of advances in aerospace technology which have found applications in other fields. Applications in medicine and in industry are considered. A sensor smaller than the head of a pin which can be inserted into a vein or artery to measure blood pressure and combinations of sensing devices and advanced electronics are among the devices discussed for medical applications. Applications for industry include new superalloys, manufacturing and management techniques, and measuring devices.

G.R.

A70-34679**Technological forecasting in the decision process.**

Daniel D. Roman (George Washington University, Washington, D.C.). *Academy of Management Journal*, vol. 13, June 1970, p. 127-138. 11 refs.

Analysis of the current state of the art in technological forecasting as a management concept representing an organized approach to the decision making process with a selective search for information. A schematic diagram is plotted to show how technological forecasting can be integrated into the management process. The areas where technological forecasting could be usefully applied for guidance are specified as planning, programming, authorization, implementation, control, and evaluation.

V.Z.

A70-31191**Aerospace capability and systems analysis applied to urban problems - Some views from a social scientist.**

W. T. Liggett (Westinghouse Electric Corp., Systems Operations Div., Baltimore, Md.). (Institute of Electrical and Electronics Engineers, Electronic and Aerospace Systems Convention, Washington, D.C., Oct. 27-29, 1969.) *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES-6, May 1970, p. 373-376.

Much has been written about the development of a general systems theory for application to civil problems, but very little documentation exists in the sense of case studies of large-scale programs implemented using the systems approach. The Model Urban Neighborhood Demonstration Program, operating in an inner-city poverty neighborhood in Baltimore, offers some lessons in this regard. With the present state of the art, the techniques of systems analysis are most effective at the subsystem level, and the necessary funding and development time should be afforded to extend their usefulness in the civil order. Existing aerospace companies provide an operating institutional base, with extensive resources, that can be beneficially translated to solving problems in the public order.

(Author)

A70-23411**Technology transfer in practice.**

Herman Bieber (Esso Research and Engineering Co., Linden, N.J.). *IEEE Transactions on Engineering Management*, vol. EM-16, Nov. 1969, p. 144-147. 6 refs.

Discussion of the need for technology transfer or coupling from the industrial viewpoint, and of how corporations perceive and respond to this need. The activities and special problems of the coupling agent are examined, together with his training and career outlook. It is pointed out that technology transfer is a demanding assignment which requires a seasoned company engineer-scientist who is obviously also well qualified for other important company staff or managerial jobs. For this reason, coupling is usually not a career assignment, but rather a rotational position. The feeling is expressed that many elements of technology transfer could be successfully taught. It is pointed out that, as the technology-transfer operation becomes more sophisticated, it will become more important for colleges and universities to pay some attention to this function in their curricular development.

M.M.

A70-22881 # Resource policy, management, and remote sensing. R. Keith Arnold (U.S. Forest Service, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Earth Resources*

Observations and Information Systems Meeting, Annapolis, Md., Mar. 2-4, 1970, Paper 70-304. 5 p. Members, \$1.00; nonmembers, \$1.50.

Discussion of the critical need and feasibility of information systems operating in near-real time to continuously monitor the production of the world's food, fiber, and other natural resources, and measure and monitor environmental changes on spaceship earth. The potential applications of remote sensing to the more timely and efficient accomplishment of agriculture and forestry jobs are discussed, together with the benefits to be derived from the ERTS (Earth Resources Technology Satellite) Program. M.M.

A70-22863 # Earth Resources National Data Processing Center—Why, what, when, how much? E. Hart and N. Gutlove (Fairchild Camera and Instrument Corp., Syosset, N.Y.). *American Institute of Aeronautics and Astronautics, Earth Resources Observations and Information Systems Meeting, Annapolis, Md., Mar. 2-4, 1970, Paper 70-324.* 8 p. Members, \$1.00; nonmembers, \$1.50.

At present, the Earth Resources program is a relatively small R&D activity primarily concerned with sensor evaluation and the development of data manipulation and analysis techniques. The latter are conducted by Principal Investigators at universities and industrial laboratories throughout the country. However, as techniques become perfected a central data processing facility should adopt them, and assume responsibility for their operational use. The Center is viewed as a vital element in what eventually will be a world-wide Earth Resources data network. A full-scale facility should be achievable by 1980 and will approach the size of current large NASA field centers. Because of the magnitude and evolutionary nature of the program, the only practical course is to plan and develop an interim facility first, then use that experience to refine the approach toward end goals. Estimates of facility functions, sizing and costs are presented. (Author)

A70-22860 # Economic factors of Earth Resources Satellite Observation and Information Systems. Mary A. Holman (George Washington University, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Earth Resources Observations and Information Systems Meeting, Annapolis, Md., Mar. 2-4, 1970, Paper 70-333.* 6 p. Members, \$1.00; nonmembers, \$1.50.

Discussion of the broader and institutional framework and some of the pertinent issues relating to Earth Resources Satellite Information Systems. Federal spending for space applications programs, NASA's Space Application Program in relation to national goals, the contribution of cost-effectiveness analysis to policy decisions about earth resources satellites, and the possibility of recovering the cost of Earth Resources Satellite Programs by the sale of satellite-obtained information are discussed. M.M.

A70-22859 # Potential institutional arrangements of organizations involved in the exploitation of remotely sensed earth resources data. T. J. Gordon and S. Enzer (Institute for the Future, Middletown, Conn.). *American Institute of Aeronautics and Astronautics, Earth Resources Observations and Information Systems Meeting, Annapolis, Md., Mar. 2-4, 1970, Paper 70-344.* 9 p. Members, \$1.00; nonmembers, \$1.50.

Exploration of various organizational forms to indicate how well they might respond to the challenges likely to be encountered in providing remotely-based earth resources services. The major problems are political, economic, and technical. Politically, some nations might be sensitive to overfly by earth resources satellites because the data collected might provide economic, military, or agricultural information which could be used to the disadvantage of that nation. Economic issues involve the identification of potential customers and determination of appropriate fee schedules, raising the required capital, and determining the optimum mode of insurance

protection. Sensor development, data compression, and information processing are some of the technological problems. Candidate organizational forms for providing earth resources services could be public, private, or international, and each of these is examined. F.R.L.

A70-22855 # A system analysis of applications of earth orbital space technology to selected cases in water management and agriculture. A. H. Muir (Earth Satellite Corp., Washington, D.C.). *American Institute of Aeronautics and Astronautics, Earth Resources Observations and Information Systems Meeting, Annapolis, Md., Mar. 2-4, 1970, Paper 70-335.* 11 p. 5 refs. Members, \$1.00; nonmembers, \$1.50.

This paper reports on a multi-discipline systems study undertaken for NASA to conceptualize a satellite-assisted information system to improve earth resource management in the areas of regional water management, wheat crop management and wheat rust control. Since in a short paper it is not practical to deal with each of the three cases equally, examples will be chosen from the water management case to illustrate a number of relevant points. Dependency matrices will be shown for all three cases in order to show the general applicability of the method employed. In order to conceptualize a realistic satellite-assisted information system, it was necessary to develop 'User Decision Models'. This approach was based on the conviction that any systems analysis must begin with an understanding of exactly how earth sensing information might both be utilized and managed within an existing or recommended operating system. The objective of the case studies was to develop a detailed total system concept utilizing satellites to assist in special areas of resource management. A practical system concept emerged from the case studies and particular attention was focused on a technique of dynamic sampling which appears to make the system much more feasible given the current state-of-the-art. (Author)

A70-12639 * MANAGEMENT OF TECHNOLOGY TRANSFER IN AN ADVANCED PROJECT—THE CASE OF SURVEYOR.

W. Eugene Giberson (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.).

(Seminar on the Management of Technology Transfer, University of California, Los Angeles, Calif., Mar. 1968.)

IEEE Transactions on Engineering Management, vol. EM-16, Aug. 1969, p. 125-129.

This work uses a specific advanced project (the Surveyor) as a basis for presenting a number of problems in technology transfer and the methods used to solve the problems. The study emphasizes the importance of mission orientation to transfer and outlines the several organizational approaches that were tried before assigning full-time project groups within the discipline departments. Several examples of planning problems are followed by a description of the organizational methods developed to deal with them. These include independent evaluation of prototypes, analysis by the user in parallel with the provider, design reviews, failure-mode analysis, and problem failure reporting. (Author)

A70-12638 TECHNOLOGICAL TRANSFER PROGRAMS AT LOCKHEED.

Willis M. Hawkins (Lockheed Aircraft Corp., Burbank, Calif.).

(Seminar on the Management of Technology Transfer, University of California, Los Angeles, Calif., Mar. 1968.)

IEEE Transactions on Engineering Management, vol. EM-16, Aug. 1969, p. 121-125.

Description of the technology transfer experience of a large company in terms of the policies of the company and the mechanics of technical management. Descriptions are given of specific transfer mechanisms, such as the research council, engineering council, technical symposia, corporate coordinators, "corporate attention" projects, and ad hoc groups. The objectives and methods upon which long-range planning is based are presented as an example of another transfer process, and some of the unsolved problems are discussed. (Author)

A70-12637**THE OPTIMUM BALANCE BETWEEN PROGRAM ORGANIZATIONS AND FUNCTIONAL ORGANIZATIONS TO PROMOTE TECHNOLOGY TRANSFER.**

Edward J. Barlow (Varian Associates, Palo Alto, Calif.).

*(Seminar on the Management of Technology Transfer, University of California, Los Angeles, Calif., Mar. 1968.)**IEEE Transactions on Engineering Management*, vol. EM-16, Aug. 1969, p. 116-121.

Study of the problem of balancing the requirements of managing a number of separate projects with the requirements of functional specialization, including achievement of technology transfer across projects, within the context of a major nonprofit corporation responsible for the general systems engineering function on major Air Force programs. The competing requirements of project responsibility and functional specialization are presented, and the organization of personnel, the distribution of responsibility and authority, and other managerial methods used are discussed in detail. Technology transfer is accomplished not only by having one individual work on several programs simultaneously but also by the use of weekly progress reports. In addition, a common computer facility and a central laboratory operation are maintained, and the technology developed in each is available across all programs. The results of this organization are evaluated in terms of effectiveness.

(Author)

A70-12636**THE TECHNOLOGY TRANSFER PROCESS BETWEEN A LARGE SCIENCE-ORIENTED AND A LARGE MARKET-ORIENTED COMPANY—THE NORTH AMERICAN ROCKWELL CHALLENGE.**

John R. Moore (North American Rockwell Corp., Aerospace and Systems Group, El Segundo, Calif.).

*(Seminar on the Management of Technology Transfer, University of California, Los Angeles, Calif., Mar. 1968.)**IEEE Transactions on Engineering Management*, vol. EM-16, Aug. 1969, p. 111-115.

Discussion of the opportunities and problems presented in the transfer of technology in a very large company between its aerospace group and a commercial products group. The process is presented in terms of the definition and value of technology, the difficulties of transfer, the objectives to be accomplished, the uses of transfer, the management of transfer, and techniques for improving transfer. Emphasis is placed upon the practical economics of the process, the organization and motivation of people, and the various mechanisms, such as committees, a "switchboard" group, and other communication means that are being developed.

(Author)

A70-12635**TECHNIQUES FOR TECHNOLOGY TRANSFER WITHIN THE BUSINESS FIRM.**

John M. Stewart (McKinsey and Co., Inc., New York, N.Y.).

*(Seminar on the Management of Technology Transfer, University of California, Los Angeles, Calif., Mar. 1968.)**IEEE Transactions on Engineering Management*, vol. EM-16, Aug. 1969, p. 103-110.

The techniques for transfer within the firm are presented in a framework of fourteen "dimensions." These include management intent or objectives; normal information mobility; balance of the business functions; motivation to transfer; potential for transfer; form of technology; sophistication gap; scale of investment; measurability of success; duration of transfer; breadth of transfer; perception of implications; extent of boundaries between functions; and degree of top-management interest. After each dimension is defined, examples of specific techniques used by successful companies are outlined.

(Author)

A70-11307**TECHNOLOGICAL FORECASTING: A PRACTICAL APPROACH.**

M. J. Cetron (U.S. Naval Material Command, Exploratory Development Div., Washington, D.C.).

New York, Gordon and Breach, Science Publishers, Inc., Technology Forecasting Institute, 1969. 367 p. 746 refs. \$24.20.

An attempt is made to give an integrated view of the most significant, practical aspects of technological forecasting and its employment in decision making. The objectives and the philosophical basis for technological forecasting are examined. Technological forecasting activity in the Federal Government is discussed. The basics of technological forecasting techniques are presented, and the mechanics of technological change are described. The use of correlation and regression analyses is considered. An example is given in order to show the nature of the content and format of a forecast.

G.R.

A70-10282 ***EXTRA DIVIDENDS FROM GOVERNMENT RESEARCH.**

Richard L. Leshner (NASA, Technology Utilization Div., Washington, D.C.).

Perspective, 2nd Quarter, 1969, p. 3-8.

Discussion of the utilization of technical developments which are by-products of the nation's investment in the exploration of space and the upper atmosphere. Sharper X-ray pictures, longer-lasting paints, safer highways, improved ambulance service, tougher metals, smaller TV cameras, new metalworking tools, and miniature medical instruments are listed as examples of such developments. Federal programs to channel technology from originator to potential user are discussed, and the NASA Technology Utilization Program is examined.

G.R.

M7 MANAGEMENT POLICY & PHILOSOPHY**A70-44688 #**

Management of large multinational space operations. Erwin A. Lauscher. *International Astronautical Federation, International Astronautical Congress, 21st, Konstanz, West Germany, Oct. 4-10, 1970, Paper. 8 p.*

Attempt to outline roughly the possible structure of an International Space Research Organization (ISRO). The structure of ISRO will have to consider political, economic, technical, and scientific requirements. ISRO would consist of a board of directors, a financial council, a technical council, program directors, a scientific council, and operational crews.

F.R.L.

A70-43996 *

The project manager - Anomalies and ambiguities. David L. Wilemon (Syracuse University, Syracuse, N.Y.) and John P. Cicero (Rochester Institute of Technology, Rochester, N.Y.). *Academy of Management Journal*, vol. 13, Sept. 1970, p. 269-282. 18 refs. Grant No. NGL-33-022-090.

Discussion of the anomalies and ambiguities characterizing some of the problems that project managers face in the everyday operation and implementation of complex missions. The complexities of the project manager's role are dependent upon both the organizational and technological demands required of him to accomplish task objectives. To meet his objectives, he must generate and maintain intensive interactions with highly skilled personnel at various levels of the organization. He must also be able to cope with the ambiguities of dealing with project contributors over whom he has no direct control. Frequently, he finds that the support he needs must come from project participants who have value systems which may conflict with the immediacy of the project's objectives. His abilities in managing the varied interrelationships in the project environment are thus critical to him in terms of his effectiveness as a manager. As additional research is undertaken on project management, management theorists may eventually construct a 'general theory of project management.' At this point, however, they must continue to analyze the ongoing research and view it in terms of building blocks for a broader theoretical construct.

M.V.E.

A70-43995 * **Technology and organization.** Raymond G. Hunt (New York, State University, Buffalo, N.Y.). *Academy of Management Journal*, vol. 13, Sept. 1970, p. 235-252. 40 refs. Grant No. NGR-33-015-061.

Review of various means of classifying organizations, and discussion of the relevance of technology to organizational structure. Developments putting technological variables in operation are analyzed, and the implications for purposive organizational planning are considered. Emphasis is placed on a 'cognitive' interpretation of technological complexity and on the role of uncertainty as a basic constraint upon organizational design. Two basically distinct organizational models are differentiated: one is oriented toward problem solving and the other toward performance. It is concluded that most management theories pertain to the latter and not the former, and various consequences of that judgment are considered. M.V.E.

A70-41173 **Current issues in military program control.** Norman Waks (Mitre Corp., Bedford, Mass.). *IEEE Transactions on Engineering Management*, vol. EM-17, Aug. 1970, p. 92-101.

Discussion of a number of issues involved in disagreements over the way in which large military programs should be managed. It is found that there is a polarization into two diverging camps concerning military program controls. One is focused on resources and the other on products. It is concluded that because there is much merit to the argument presented on both sides of many of these issues, the direction that must be taken in the program-control field is not to attempt to resolve the individual issues directly; rather, it is to deal with root causes that can accommodate both points of view. A sample of three suggestions in this regard is offered. G.R.

A70-40371 * **A fundamental approach to aircraft manufacturing cost estimating in the conceptual design phase.** Darrell E. Wilcox and Thomas J. Gregory (NASA, Office of Advanced Research and Technology, Mission Analysis Div., Moffett Field, Calif.). *Society of Aeronautical Weight Engineers, Annual Conference, 29th, Washington, D.C., May 4-6, 1970, Paper 865*. 15 p. 6 refs. \$36. per set of 36.

Description of an improved method for estimating manufacturing costs in the conceptual design phase. It is shown that detailed design definition, including such physical characteristics as the total number of parts and pieces and the size and weight of each part, can be achieved with an extension of a typical structural synthesis computer program that is based on analytical descriptions of standard design practice. It is also pointed out that a simulated cost buildup can be generated from the parts list by analytically describing standard manufacturing practices, material lists, and the labor time required in each manufacturing step for every part. The application of these concepts to the estimation of the manufacturing costs of a vertical stabilizer box structure serves to describe the proposed method, which is then compared with present cost estimating techniques used in the conceptual design phase. In conclusion, some suggestions are offered for extending the new approach to the estimation of design, tooling, and test costs. M.V.E.

A70-37862 * **Management information systems - Lessons learned in the Apollo program.** C. E. Andressen, Jr. (NASA, Marshall Space Flight Center, Huntsville, Ala.). In: *Engineering for the 70's; Institute of Electrical and Electronics Engineers, Annual Region III Convention, 8th, Huntsville, Ala., November 19-21, 1969, Proceedings*. Edited by S. Kastorff. Huntsville, Ala., Institute of Electrical and Electronics Engineers, Inc., 1969, p. 324-328.

Discussion of the experience gained from the development of management information systems for the Apollo lunar program. It was learned that an efficient management information system must contain certain basic elements consisting of a plan of action, a

method of verifying data accuracy, a selective method of data display, compatible data sources, appropriate discipline, and an effective feedback capability. The display of data must be tailored to the individual manager just as the management system must be tailored to the situation. Further, a management information system can achieve its goal only when the system receives the acceptance of both the manager and the employee. It has also been found that while computers hold great potential for more effective management information systems, a large amount of work remains to be done before this potential is fully realized. T.M.

A70-31571 * **Project authority - A multidimensional view.** John P. Cicero and David L. Wilemon (Syracuse University, Syracuse, N.Y.). *IEEE Transactions on Engineering Management*, vol. EM-17, May 1970, p. 52-57. 17 refs. Grant No. NGL-33-022-090.

This paper delineates some basic authority relationships within five models of project management: (1) the individual model; (2) the staff model; (3) the intermix model; (4) the aggregate model; and (5) the NASA/Apollo model. The authority construct is broken down into formal authority (authority inherent with the position and organizationally derived) and influence (authority generated by the project manager through his own technical competence and his administrative skills). The focus of this paper explains how the bases and functions of authority tend to shift within the various project-management models. An examination of the project manager's use of formal authority and influence in varying project contexts eliminates some of the ambiguity surrounding the concept of project authority. (Author)

A70-30939 # **International co-operation in the military field.** Norman Coles (Ministry of Defence, London, England). In: *Royal Aeronautical Society, Two-Day Convention on Economic Factors in Aviation, London, England, May 13, 14, 1970, Proceedings*. London, Royal Aeronautical Society, 1970. 17 p.

Review of experience in international cooperation in the military field, which was undertaken to share development costs, lengthen production lines with the intent to cut production costs, and to improve export prospects. The fields in which cooperation is taking place, and the major current collaborative projects of air interest which have been undertaken are described. The main methods of collaboration are discussed, and the effects of collaboration on programs and costs are examined. The overall balance of advantages is summarized, and the factors which are conducive to successful project collaboration are outlined. F.R.L.

A70-30938 # **The economics of military aviation.** Handel Davies (British Aircraft Corp., Ltd., London, England). In: *Royal Aeronautical Society, Two-Day Convention on Economic Factors in Aviation, London, England, May 13, 14, 1970, Proceedings*. London, Royal Aeronautical Society, 1970. 17 p.

Analysis of the nature of the military aviation business, with discussion of how best to ensure that the aircraft industry in the U.K. continues to play a large and, if possible, an increasing part in it. It is considered that world demand for military equipment will continue to be very large for a long time to come. It is important that the aircraft industry and the government should work in the closest possible harmony to ensure that the right projects are undertaken at the right time, taking into account the requirements of the Royal Air Force and of other potential customers, and the need for a stable well-planned program. F.R.L.

A70-28825 **An empirical study of the applicability of management science within the top management positions of a large organization.** Robert B. Breitenbach (Oklahoma State University, Stillwater, Okla.). *IEEE Transactions on Engineering Management*,

vol. EM-17, Feb. 1970, p. 2-10. 27 refs.

This paper reports a research study that attempted to determine whether top management positions within a specific organization are compatible with management science techniques. A questionnaire was employed to test the feasibility of introducing specific management science concepts. The results and recommendations of the study are included. It is hoped that the methodology reported, especially the questionnaire design, will be of use in future related research. (Author)

A70-27772 Age discrimination in employment - Air carriers. Ronald A. Bergman. *Journal of Air Law and Commerce*, vol. 36, Winter 1970, p. 3-29. 237 refs.

Discussion of problems connected with age discrimination in the employment practices of air carriers. The various stages of legislative measures adopted to regulate the field of age discrimination in hiring practices are reviewed, and the stewardess retirement problem as well as the pilot hiring problem are discussed. The FAA pilots retirement rule and the stewardess retirement problem are critically reviewed. It is concluded that the maximum hiring age policies could stand close scrutiny by the Labor Department. However, the difficulty of proof, added to an already heavy enforcement workload, results in uncertainty as to whether the Age Discrimination in Employment Act will actually help society use the talents of the older pilot as it should. M.M.

A70-24661 The evolution of management systems. Russell L. Ackoff (Pennsylvania, University, Philadelphia, Pa.). *Canadian Operational Research Society, Journal*, vol. 8, Mar. 1970, p. 1-13.

In the present-day management system, the role of the manager is quite different from that which existed before the second industrial revolution. It has been changed, but not diminished, by the advent of the computer and the ever-increasing sophistication in the computerized systems which have become available over the past two decades. This paper discusses the growth of the management system in relation to the development of computer applications. (Author)

A70-22494 Management style of a space project boss. Evan Herbert. *Innovation*, no. 10, 1970, p. 14-27.

Survey of the challenges posed by the government environment to the management of government-sponsored big technology. These challenges, of which uncertainty is the principle one, are illustrated by the example of problems which confront Milton Klein as a program manager responsible for the development of a nuclear engine of high specific impulse for extremely long space missions. V.P.

M8 ECONOMICS

A70-43506 # Participation of U.S. industry in the European Application Satellites Program. E. O. Marriott (Hughes Aircraft Co., Space Systems Div., El Segundo, Calif.). *EUROSPACE, U.S.-European Conference, 4th, Venice, Italy, Sept. 22-25, 1970, Paper*. 17 p.

Discussion of the role that the U.S. can play in the European Application Satellites Program. Four possible alternatives of U.S. participation in a European program are examined from the standpoint of technical or management difficulties expected, effects on cost and schedule, and advantages to Europe. Interesting possibilities for Europe to participate in two ATS-F experiments are pointed out. It is noted that, if the prime interest is the development of European space technology, Europe should put her efforts in completely planned and executed European programs. All aspects of programs should be done by Europe, resulting in maximum development of management techniques, design capability, fabrication and test techniques and facilities. However, greater time and expense to put a given space capability in orbit will result. For a

given expenditure, less total benefit from space capability will result. If the European objective is to find those space applications which result in maximum benefit to the users and exploit them to the maximum, Europe should look at more utilization of U.S. participation. There are a multitude of ways to maximize the effectiveness of the space dollar in putting actual, live operating satellites into space. M.M.

A70-30937 # Market research - An economic necessity. B. A. H. Botting (Hawker Siddeley Aviation, Ltd., Kingston-upon-Thames, Surrey, England). In: Royal Aeronautical Society, Two-Day Convention on Economic Factors in Aviation, London, England, May 13, 14, 1970, Proceedings. London, Royal Aeronautical Society, 1970. 18 p.

Examination of the reasons why airlines buy aircraft. It is pointed out that mistakes in attempting to match a project to a market can be disastrous because of the large increase in costs of designing, developing, and manufacturing today's complex aircraft. The manufacturer must not only assure himself that a worthwhile market exists for his product, but he must also ensure that the aircraft he is about to undertake is well matched to his resources and capabilities, because only in this way will he be able to market it profitably at a competitive cost. Timing, in relation to the market and competition, is an extremely important factor. The role of market research in pricing policy, and the tools of market research are discussed. F.R.L.

A70-22971 Future of federal contract research centers. Dean C. Coddington and J. Gordon Milliken (Denver, University, Denver, Colo.). *Harvard Business Review*, vol. 48, Mar.-Apr. 1970, p. 103-116.

Study of the objectives and characteristics of forty federal contract research centers (FCRCs) and their future. The special characteristics of the FCRCs are described and several crucial issues posed by their operations and policies are examined. Questions of the independence desirable for the FCRCs are considered. It is recommended that the FCRC organizational form should continue to be a valuable R&D option to the federal government. G.R.

A70-19733 POLITICAL ECONOMY AND GEOGRAPHIC DISTRIBUTION OF FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT—THE MIDWEST CASE.

Thomas P. Murphy (Missouri, University, Kansas City, Mo.). *Administrative Science Quarterly*, vol. 14, Sept. 1969, p. 426-441. 16 refs.

Comments on the Midwest's complaint that it is not receiving a fair share of federal research and development expenditures. This claim is reviewed not only on the basis of contracts received but also in terms of data on bidding practices of industrial organizations across the nation on large NASA contracts over a five-year period. It is true that citizens from all the states provide the tax money required to support research and development and that it is therefore appropriate for Congress to study policies conducive to directing money particularly to 'disadvantaged' areas. However, programs of federal subsidies designed to offset the existing regional advantages of economies of scale, specialization, and marginal utility might create greater economic problems than they would solve. The legislative branch must be prepared to accept the fact that research and development expenditures of federal agencies will not be distributed to the regions on a proportional basis when the competence to perform such work is geographically restricted. The federal research and development program is an inappropriate vehicle for bolstering economically depressed or sagging regions. M.V.E.

M9 GENERAL

No Abstracts in this Category.

DDC ENTRIES

M1 PROGRAM & PROJECT
MANAGEMENTA PRODUCTION PLANNING MODEL FOR A
GOVERNMENTAL AGENCY WITH MULTI-
PRODUCTION FACILITIES.

Master's thesis,
Naval Postgraduate School Monterey Calif
Maurice Albert Roesch, III. Sep 70. 79p

Descriptors: (*Management planning, Mathematical models), (*Federal budgets, Production control), Organizations, Cost effectiveness, Optimization, Decision making, Data processing systems, Marine Corps, Logistics, Theses.
Identifiers: *Production planning, Management information systems, Production control.

A decision model is formulated for the planning of production for a large centrally managed governmental agency with multi-production facilities. The concepts of linear economics and mathematical programming are utilized to develop the model as a single-period planning tool for the efficient allocation of resources and production effort. It is assumed that the governmental agency desires to optimize the conversion of its input resources to outputs for all its production facilities. Under this assumption, the two separate problems of effectiveness maximization and cost minimization for the agency as a whole are considered. The questions of data collection, parameter estimation, and management utilization of the model are also addressed. A specific formulation of the model is presented for the decision problem of the maintenance and overhaul of the major end items of equipment within the logistical system of the Marine Corps. (Author)
AD-712 827

SIMULATION OF MACRO MULTI-ECHOLON
INVENTORY POLICIES,

George Washington Univ Washington D C Program in Logistics
Sheldon E. Haber. 18 Aug 70, 37p* Rept no. Serial-T-241
Contract N00014-67-A-0214-0001

Descriptors: (*Management planning, Maintenance), (*Spare parts, Inventory control), Logistics, Mathematical models, Cost effectiveness, Substitutes, Factor analysis, Simulation, Naval research.
Identifiers: Evaluation, Multiechelon systems, Alternatives, Management information systems.

Alternative repair part inventory policies are examined for a multi-echelon logistics system. The policies assessed pertain to the design of multi-echelon systems rather than the evaluation of stock level decisions for individual repair parts.

Although the context is one of a military inventory system, the policies examined are of importance in non-military systems where item failure rates are low and only periodic access to resupply is possible. (Author)
AD-712 808

INFORMATION SYSTEM DESIGN IN LARGE
SCALE LOGISTIC SYSTEMS,

Rand Corp Santa Monica Calif
E. P. Durbin. Sep 70, 15p Rept no. P-4308-1

Descriptors: (*Management engineering, Data processing systems), Management planning, Systems engineering, Programming (Computers), Factor analysis, Logistics, Decision making, Design, Cost effectiveness.
Identifiers: Information systems, Management information systems.

In a complex organization, an information system performs the same function as the nervous system in the human body. The paper deals with information systems used by managers and planners in very large organizations. Most attention in large systems has been directed at the transition between second and third generation computer equipment. Second generation systems are characterized by serial memory (tape units), sequential batch processing, and only one user at a time on the central processor. Third generation systems are characterized by direct access memory, various terminal options, multi-programming, and multi-user time sharing. (Author)
AD-712 693

ANALYSIS OF INVENTORY RECORD ACCU-
RACY.

Technical rept.,
Naval Postgraduate School Monterey Calif
David A. Schrady, and W. Dean Free. Jul 70, 76p*
Rept no. NPS-55So/Fs00771A

Descriptors: (*Inventory, Accuracy), Mathematical models, Simulation, Statistical data, Correlation techniques, Analysis of variance, Probability density functions, Programming (Computers), Control systems, Regression analysis, Logistics, Management planning.
Identifiers: Poisson density functions, Demand (Economics), Management information systems.

The inventory record accuracy problem was studied using a complex simulation model of stock point supply operations. Complete item and error data were obtained from various sources within the Navy Supply System. The experiments related the presence of stock record errors to supply operations, in terms of quantified measures, and in an environment of imperfect receipt and issue processing, and physical inventories, supply effectiveness was tested against record accuracy. A rational criterion for determining the optimal physical inventory policy was developed. (Author)
AD-711 002

RANDOM INVENTORY MODELS WITH BULK
DEMAND AND STATE-DEPENDENT LEAD-
TIMES,

George Washington Univ Washington D C Program in Logistics
Donald Gross, Carl M. Harris, and James A. Lechner. 22 Jun 70, 32p Rept no. Serial-T-237
Contract N00014-67-A-0214-0001

Descriptors: (*Replacement theory, Queueing theory), Statistical processes, Stochastic processes, Distribution functions, Lead time, Op-

timization, Costs.

Identifiers: Poisson density functions, Markov processes, State dependent processes, Demand (Economics).

The paper describes two one-for-one ordering (S-1,S) inventory models in which the time required for order replenishment is state dependent. The demand is assumed to follow a compound Poisson distribution, and that portion of the leadtime corresponding to the actual filling of orders is assumed to depend on the number of outstanding orders. Since the orders placed are assumed to go into a single-server queue, queueing results are used to obtain the expected inventory cost as a function of S in order to obtain an optimal value of S. (Author)
AD-710 362

REVIEW OF SEQUENCING RESEARCH.

Sylvania Electric Products Inc Towanda Pa Chemical and Metallurgical Div
James E. Day, and Michael P. Hottenstein. 1970, 30p

Prepared in cooperation with Pennsylvania State Univ., University Park. Coll. of Business Administration.

Availability: Pub. in Naval Research Logistics Quarterly, v17 n1 p11-39 Mar 70, NAVSO P-1278.

Descriptors: (*Machine shop practice, Scheduling), Mathematical programming, Algorithms, Matrix algebra, Queueing theory.
Identifiers: Job shops, Job shop scheduling, Sequencing.

The majority of research articles published on job shops appears to be concerned with the effects of scheduling and sequencing (dispatching) on various measures of shop performance criteria. Usually these effects are studied in a given context, a context which can be described by making the appropriate choice from each of the following three classifications: number of component parts comprising a job, production factors possessed by the shop, and jobs available for processing. (Author)
AD-709 255

LARGE SCALE INFORMATION PROCESSING
SYSTEMS. VOLUME V. STUDY OF ASSOCIA-
TIVE MEMORY SYSTEMS.

Final technical rept. 15 Jul 67-15 Jan 70,
Syracuse Univ N Y
T. Feng. May 70, 335p* RADC-TR-70-80-Vol-5
Contract F30602-68-C-0013
See also Volume 4, AD-708 728.

Descriptors: (*Data processing systems, Digital systems), Data storage systems, Search theory, Information retrieval, Computer logic.
Identifiers: *Associative storage.

Contents: Associative memory system manipulations; Associative memory system organizations.
AD-708 729

LARGE SCALE INFORMATION PROCESSING
SYSTEMS. VOLUME IV. SPECIAL INVESTIGA-
TIONS.

Final technical rept. 15 Jul 67-15 Jan 70,
Syracuse Univ N Y
W. LePage, R. Prather, R. Sargent, D. Weiner, and K. Fishell. May 70, 141p* RADC-TR-70-80-Vol-4
Contract F30602-68-C-0013
See also Volume 3, AD-708 727 and Volume 5, AD-708 729.

Descriptors: (*Data processing systems, Digital

systems), Programmed instruction, Automata, Inventory, Motion pictures, Algebras, Computer logic.

Identifiers: CAI (Computer Aided Instruction), *Computer aided instruction, Computer generated motion pictures, Computer animation, Boolean algebra.

Contents: Computer aided instruction; A categorical verification of automata theory; Computer aided design of inventory systems; Computer generated films; Instructional applications; A note on the solution of sequential boolean equations. AD-708 728

LARGE SCALE INFORMATION PROCESSING SYSTEMS. VOLUME III. INVESTIGATIONS IN COMPUTER LANGUAGES.

Final technical rept. 15 Jul 67-15 Jan 70, Syracuse Univ N Y
G. Foster, E. Stabler, H. Offek, and G. Rossmann. May 70, 145p* RADC-TR-70-80-Vol-3
Contract F30602-68-C-0013
See also Volume 2, AD-708 726, and Volume 4, AD-708 728.

Descriptors: (*Data processing systems, Digital systems), (*Programming languages, Scientific research), Transformations.

Contents: A programming language--Manipulation of data structures and some proposed extensions; System description languages; Microprogram transformations; Graph description language; Program schemata and microprogram transformation. AD-708 727

LARGE SCALE INFORMATION PROCESSING SYSTEMS. VOLUME II. INVESTIGATIONS IN DATA MANAGEMENT.

Final technical rept. 15 Jul 67-15 Jan 70, Syracuse Univ N Y
P Atherton, K. Miller, D. Aurricchio, and H. Schwarlander. May 70, 74p* RADC-TR-70-80-Vol-2
Contract F30602-68-C-0013
See also Volume 1, AD-708 725 and Volume 3, AD-708 727.

Descriptors: (*Data processing systems, Digital systems), Information retrieval, Data storage systems, Search theory.
Identifiers: *Data management.

Contents: LC/MARC on molds--an experiment in computer-based, interactive bibliographic storage, search, retrieval, and processing; SURPARS--an on-line data system; Information retrieval project. AD-708 726

LARGE SCALE INFORMATION PROCESSING SYSTEMS. VOLUME I. INVESTIGATIONS IN NATURAL LANGUAGES.

Final technical rept. 15 Jul 67-15 Jan 70, Syracuse Univ N Y
P. L. Peterson, R. D. Carnes, I. R. Reid, and E. J. O'Connell. May 70, 147p* RADC-TR-70-80-Vol-1
Contract F30602-68-C-0013
See also Volume 2, AD-708 726.

Descriptors: (*Data processing systems, Digital systems), Design, Semantics, Computational linguistics, Language, Syntax.
Identifiers: Natural language.

The report consists of five volumes containing several reports from a number of academic and research staffs investigating new approaches or new methods in the design or utilization of information processing systems, with particular emphasis on large scale digital systems. The investiga-

tions were concerned with four main areas of interest. The first is in methods for the improvement of system effectiveness and for extending the range of applications of large scale systems, with particular emphasis on on-line, time-shared techniques for user-oriented systems. The second was investigation into the application of large scale information systems to problems in diverse areas. Primary emphasis was on problems requiring non-numeric techniques. Third was investigation into measures of efficiency, cost-effectiveness, and user reaction to various types of systems, with emphasis on system and user adaptability. Fourth was investigations in the fundamental theoretical structure of large scale systems, its component elements, and related areas of technology. (Author)
AD-708 725

INTERACTIVE DESIGN COORDINATION FOR THE BUILDING INDUSTRY.

Technical memo., Massachusetts Inst of Tech Cambridge Civil Engineering Systems Lab
James N. Jackson. 22 Jun 70, 35p* Rept no. MAC-TM-10
Contract N00014-69-A-0276-0002

Descriptors: (*Buildings, Design), (*Management control systems, Buildings), Data processing systems, Decision making, Systems engineering, Contracts, Interactions, Digital computers, Construction, Management planning.
Identifiers: ICES (Integrated Civil Engineering Systems), Integrated civil engineering systems, *Management information systems, Building industry, Data management, Gross national product.

One of the responses to the need for effective interaction in the use of computers for a design project is the supersystem concept proposed for ICES, the Integrated Civil Engineering System. The supersystem is defined as the cooperative effort on the part of the designers of several problem oriented computer capabilities to implement project oriented capabilities by allowing each of their problem oriented subsystems to reference a single file of project data. The supersystem would allow design interaction by having each of the problem oriented computer subsystems reference a single file of information specifying the project. Future work in the application of computers to interactive and project oriented design in the building industry will have to concentrate on the file structure to be used in the implementation of a computer building design supersystem. (Author)
AD-708 400

CHIEF OF NAVAL OPERATIONS COMMAND/MANAGEMENT INFORMATION SYSTEM (CNOCOM/MIS) STUDY. VOLUME II.

Final rept. Apr-Oct 69, Planning Research Corp Washington D C
R. A. Jones, R. C. Walker, R. Dully, M. R. Lackner, and J. P. Reardon. Jan 70, 205p Rept no. PRC-R-1388-Vol-2
Contract N00014-69-A-0321
See also Volume 1, AD-708 027.

Descriptors: (*Naval operations, Management control systems), (*Management control systems, *Information retrieval), Data processing systems, Management planning, Decision making, Data storage systems, Data transmission systems, Command + control systems, Input-output devices, Recording systems, Computers, Programming (Computers), Flow charting, State-of-the-art reviews, Design.
Identifiers: *Management information systems, Military planning.

The objective of the Chief of Naval Operations

Command/Management Information System (C-NOCOM/MIS) Study, as set forth in reference (a), is to develop a concept and implementation plan for the operation of a Chief of Naval Operations command/management information system which will provide Naval Operations management the capability to retrieve, display, evaluate and transmit information. The study is limited to the methods and facilities required to extract and fully utilize information from an automated data bank and is concerned with determining the required management/system interactions. It will deal with the development of operational procedures which will provide maximum responsiveness to the needs of the users. The determination of specific user information requirements and the design of the internal data processing system itself is being accomplished by separate means.
AD-708 028

CHIEF OF NAVAL OPERATIONS COMMAND/MANAGEMENT INFORMATION SYSTEM (CNOCOM/MIS) STUDY. VOLUME I.

Final rept. Apr-Oct 69, Planning Research Corp Washington D C
R. A. Jones, R. C. Walker, R. Dully, M. R. Lackner, and J. P. Reardon. Jan 70, 260p Rept no. PRC-R-1388-Vol-1
Contract N00014-69-A-0321
See also Volume 2, AD-708 028.

Descriptors: (*Naval operations, Management control systems), (*Management control systems, *Information retrieval), Data processing systems, Management planning, Decision making, Data storage systems, Data transmission systems, Command + control systems, Flow charting, Design, State-of-the-art reviews.
Identifiers: *Management information systems, Military planning.

The purpose of the Chief of Naval Operations Command/Management Information System (C-NOCOM/MIS) study was to develop an overall operating system concept and an implementation plan as a framework within which the Information Systems Division could design and implement CNOCOM/MIS. The objective of the system concept and implementation plan is to provide the Chief of Naval Operations and the OPNAV staff a framework within which to develop the capability to acquire, store, retrieve, display, evaluate and transmit information from an integrated data base to achieve better support for the information requirements of the Navy. The system to be implemented is to be highly automated and capable of responding to requirements in a timely fashion. (A THOR)
AD-708 027

PPBS, SUBOPTIMIZATION, AND DECENTRALIZATION,

Rand Corp Santa Monica Calif
Arthur Smithies. Apr 70, 36p Rept no. RM-6178-PR
Contract F44620-67-C-0045

Descriptors: (*Department of Defense, Budgets), (*Management planning, Decision making), Optimization, Mathematical models, Cost effectiveness, Standards, Factor analysis, Operations research.
Identifiers: Decentralization, *Planning programming and budgeting systems, Suboptimization, *Management information systems.

A theoretical discussion is presented of suboptimization and decentralization to consider the appropriateness of various financial controls, constraints, and incentives in military planning. The

analysis is applied to various alternative forms of organization in the Department of Defense: decentralization by services, by service and program, and by services with some reallocation of functions; decentralization by theater; full unification; and decentralization by strengthening the central controls of the present system.
AD-707 097

ITEM STOCKAGE FOR A LOOSE ISSUE WAREHOUSE.

Defense Supply Agency Alexandria Va

Mar 70, 17p*

Descriptors: (*Warehouses, Management planning), (*Inventory control, Cost effectiveness), Mathematical prediction, Statistical analysis, Partial differential equations, Department of Defense.
Identifiers: Loose issue materiel, Bin replenishment.

The report outlines a procedure for stocking a loose issue operation in such a way that replenishment costs are minimized. The basic principle is that of giving preference, within the limits of available space, to those items for which a small amount of space will contain a long-lasting supply; thus reducing the number of bin replenishments required for a given number of issue documents. This provides for the largest possible size of a bin replenishment so as to make best utilization of materials handling equipment. (Author)
AD-704 185

INVENTORY SYSTEMS WITH IMPERFECT ASSET INFORMATION,

Decision Studies Group Palo Alto Calif

Richard C. Morey, and Donald L. Iglehart. 1 Mar 70, 19p Rept no. R-102-14
Contract N00014-70-C-0119

Descriptors: (*Stock level control, Reliability), Mathematical models, Errors, Management planning, Data processing systems, Costs, Probability, Statistical processes, Warehouses.
Identifiers: Warehouse denials.

The report studies inventory systems in which the stock records are in error. The overall goal is to determine economically the proper level of stock record accuracy to maintain, consistent with insuring that the remaining errors do not contribute significantly to warehouse denials, i.e., phenomena in which the stock records show a balance sufficient to cover a material release order, but for which insufficient units of physical stock can be found. The factors considered in addition to the statistics of the errors, are the costs and movement of the items and the costs and accuracies of the various types of counting procedures available. The approach taken determines the type and frequency of the counts, together with the modifications to a predetermined stocking policy, to insure, at minimum total cost per unit time, that the likelihood of a warehouse denial occurring between counts is held below some prescribed level. (Author)
AD-704 161

INFORMATION SYSTEM DESIGN IN LARGE SCALE LOGISTIC SYSTEMS,

Rand Corp Santa Monica Calif

E. P. Durbin. Mar 70, 15p Rept no. P-4308

Descriptors: (*Logistics, *Information retrieval), Systems engineering, Advanced planning, Military organizations, Design, Data processing systems.
Identifiers: *Information systems.

Modern systems analysis is an effort to apply structured rationality to problems of choice. To be of use in information system design in large organizations the analyst must be aware that techniques of analysis require time and data. Neither may be available. New techniques are required which allow rapid modeling of information systems. In addition the analyst must understand that institutional factors cause real design to proceed from simultaneous policy and hardware selection through software to the final system. The analyst must supply advice on policy phasing, equipment phasing, flexibility, and backup. The paper described a situation in which a design process goes backwards from what is suggested. The implications for new analysis techniques may not be so much computational as educational. (Author)
AD-703 561

ILS-PREREQUISITE TO IMPROVED OPERATIONAL CAPABILITY,

Rand Corp Santa Monica Calif

R. M. Paulson, and R. B. Waina. Mar 70, 34p Rept no. P-4318

Descriptors: (*Management planning, Logistics), (*Air Force operations, Maintenance), Department of Defense, Systems engineering, Life expectancy, Decision making, Cost effectiveness, Models (Simulations), Time, Effectiveness.
Identifiers: ILS (Integrated Logistic Support), Integrated logistic support, Logistics management, Management information systems.

The document covers a composite of the elements necessary to assure the effective and economical support of a system or equipment at all levels of maintenance for its programmed life cycle. (Author)
AD-702 688

MORE ADO ABOUT EOQ.

Operations analysis technical memo.,

Air Force Logistics Command Wright-Patterson AFB Ohio Operations Analysis Office
Victor J. Presutti, Jr., and Richard C. Trepp. Jan 70, 27p Rept no. OATM-9

Descriptors: (*Inventory control, *Procurement), Cost effectiveness, Stock level control, Mathematical models, Decision making, Probability density functions.
Identifiers: EOQ (Economic Order Quantity), Economic order quantity.

The paper is concerned with the determination of explicit expressions for economic order quantities and reorder levels such that the cost of ordering and holding inventory is minimized for specific backorder constraints. Holding costs are applied either to inventory position or on-hand inventory, and the backorder constraint is considered in terms of the total number of backorders per year or the average number of backorders at any point in time. Through the substitution of a new probability density function in place of the normal p.d.f., explicit expressions are determined for the economic order quantities and the reorder points. The resulting economic order quantities are independent of all backorder constraints. It is also concluded that under certain conditions, the minimization of ordering costs and inventory holding costs (applied to inventory position), subject to a backorder constraint, is equivalent in terms of reorder levels to minimization of the safety level dollar investment subject to the same backorder constraint. (Author)
AD-700 156

M2 CONTRACT

MANAGEMENT

USE OF MAGNETIC TAPE FOR REPORTING COST INFORMATION,

Rand Corp Santa Monica Calif

Joseph String, Jr. Sep 70, 53p Rept no. RM-6313-PR

Contract F44620-67-C-0045

Descriptors: (*Management planning, Cost effectiveness), (*Data processing systems, Magnetic tape), Information retrieval, Contracts, Procurement, Costs.
Identifiers: Accounting, Data acquisition, Cost analysis.

As an alternative to the current practice of submitting cost reports on paper, this study suggests incorporating the capabilities of electronic data processing in the design of reporting systems and using magnetic tape as the primary medium for reporting and storing data. Instead of submitting printed reports, a contractor would provide documentation of his accounting system and work assignment structure at the initiation of a procurement program, and provide periodic tape copies of his internal accounting records during the acquisition phase. A sample program was selected as a test case and all major tasks were performed, including in-depth reviews of the contractor's accounting system and the procurement program's work breakdown structure. A series of specialized paper reports were printed using a generalized report-generating program written for the project. No problems were encountered that could be attributed to the basic concepts of the system or to the principal elements of implementation. (Author)
AD-713 606

CONCENTRATION IN MILITARY PROCUREMENT MARKETS: A CLASSIFICATION AND ANALYSIS OF CONTRACT DATA,

Rand Corp Santa Monica Calif

James W. McKie. Jun 70, 31p Rept no. RM-6305-PR

Contract F44620-67-C-0045

Descriptors: (*Commerce, Armed forces procurement), (*Armed forces procurement, Contracts), Classification, Statistical analysis.
Identifiers: Marketing, Defense contracts.

The report develops an industry classification system for military procurements and, using DOD purchase data, estimates concentration in these industries. The study derives 4-firm concentration ratios on an industry basis and also estimates the proportion of each industry's sales going to the DOD. These ratios are compared with conventional DOD concentration measures as well as nondefense concentration ratios. Results show that unilateral buyer and seller monopolies are both rare in defense markets, the typical situation is bilateral market power, and the 100 largest defense contractors vary greatly in the percentage of military sales. The concentration figures suggest that new economic models of market relationships are needed to analyze the economics of defense markets. Also, a market dimension should be added to the DOD procurement data. (Author)
AD-710 589

QUEUEING THEORETIC ANALYSIS OF CONTRACTORS' SEQUENTIAL BIDDING PROBLEMS. I,

Rand Corp Santa Monica Calif

Leonard H. Zacks. Jul 70, 31p Rept no. P-4412/1

Descriptors: (*Queueing theory, Contracts),

(*Contracts, Sequences), Matrix algebra, Mathematical models, Optimization, Costs.
Identifiers: *Contractors, *Bidding.

One considers here the bidding problem of a contractor with a fixed amount of resources producing products under time incentive contracts. A time incentive or schedule incentive contract is a function $T(x)$, x is epsilon (0, infinity), which specifies that a contractor will receive a payment $T(x)$ if he completes the product x time units after he was awarded the contract. The contractor simultaneously services a number of such contracts, so that whenever a new RFP arrives, the contractor will have his fixed resources spread among a number of contracts in various stages of completion. (Author)

AD-710 271

EXPLORATORY STUDY OF SUBCONTRACTOR PROPOSAL COSTS.

Logistics Management Inst Washington D C

Apr 70, 22p Rept no. LMI-70-10
Contract SD-271

Descriptors: (*Department of Defense, Logistics), (*Contracts, Cost effectiveness), Weapon systems, Feasibility studies, Government procurement, Problem solving, Management planning.
Identifiers: *Logistics management, Management information systems, *Multiple subcontractor proposals, Subcontracting, Competition.

The study was initiated to determine whether one facet of bid and proposal effort on major weapon systems acquisition -- the submission of complex proposals by principal subcontractors to several prime contract competitors -- was unduly burdensome and costly. The primary source of information was interviews with defense industry representatives. It was found that submission of multiple proposals by major subcontractors did not appear a frequent occurrence. Subcontractors, however, who did submit multiple proposals found their efforts characterized by peak demands for technical talent and overhead funds.

AD-707 732

DoD-CONTRACTOR RELATIONSHIP-- PRELIMINARY REVIEW.

Logistics Management Inst Washington D C

Mar 70, 91p Rept no. LMI-69-21
Contract SD-271

Descriptors: (*Department of Defense, Logistics), (*Contracts, Management planning), Weapon systems, Industrial relations, Friction, Problem solving, Costs, Time.
Identifiers: Logistics management, Management information systems.

The study was a preliminary investigation to define the scope of the basic problems in the DoD-industry interface. The results of the study apply to the defense-industry relationship which has been marked by discord and controversy; problems which have resulted in confusion in theory and practice; and the increase in the technological complexity of weapon systems which causes acquisition management to become more difficult. (Author)

AD-707 731

REPORT OF THE DEFENSE-INDUSTRY JOINT COST REDUCTION WORK SHOPS, FEBRUARY-APRIL, 1967.

Assistant Secretary of Defense (Installations and Logistics) Washington D C

31 May 67, 179p

Descriptors: (*Department of Defense, Contracts), (*Costs, Reduction), Symposia, Value engineering, Industries.

Contents: The 1967 defense-industry joint cost reduction workshops; Review of the DoD instruction on monitors and critique of contractor guidelines; Increasing the effectiveness of the value engineering program; The practical problems of maximizing results from the DoD-contractor cost reduction program; A computer approach to cost reduction; and Untapped cost reduction opportunities.

AD-702 614

M3 RESEARCH & DEVELOPMENT

A SERIES OF STUDIES ON THE DESIGN REQUIREMENTS FOR A REAL-TIME INFORMATION AND COMPUTATIONAL SYSTEM TO ASSIST R AND D MANAGEMENT IN THEIR PROJECT SELECTION DECISION-MAKING.

Final rept. 1965-1970,
Northwestern Univ Evanston Ill Dept of Industrial Engineering and Management Sciences
Albert H. Rubenstein, Norman R. Baker, R. Patrick Forster, Arthur P. Hurter, Jr., and Daniel L. Kegan. Jul 70, 15p Rept no. 70-33
Contract Nonr-1228 (38)

Descriptors: (*Research program administration, Management planning), (*Decision making, Mathematical models), Standards, Factor analysis, Programming (Computers), Real time, Reviews, Selection, Data processing systems, Information retrieval.

Identifiers: Research and development, Information systems, Computer analysis, Evaluation.

The paper reports on a series currently underway which are part of a long term project aimed at specifying the design requirements for a real-time, computer-aided, information system for the selection, review and evaluation of research and development (R and D) projects. Specifically the report focuses on phases of the research which have been supported by the Office of Naval Research. (Author)

AD-713 244

RESEARCH AND DEVELOPMENT COORDINATION AS A PROBABILITY PROCESS.

Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
D. P. Gaver, and V. Srinivasan. Jan 70, 15p Rept no. RR-193
Contract Nonr-760 (24)

Descriptors: (*Scientific research, Queueing theory), (*Industrial production, Mathematical prediction), Mathematical models, Probability, Statistical analysis, Time, Partial differential equations, Management engineering.
Identifiers: Research and development, Competition.

Models are set up to help decide upon the appropriate scales of research and development activities in an organization when competitive preemption of new ideas is a possibility. (Author)

AD-711 835

GUIDE TO PROBLEM ANALYSIS OF ADVANCED TECHNOLOGICAL OBJECTIVES: METHODOLOGY FOR PROBLEM RESEARCH.

Technical rept.,
Progress Management Services Arlington Va
Robert J. Massey, and Alexander G. Hoshovsky.
Feb 70, 22p* OAR-70-006
Contract F44620-68-C-0065

Descriptors: (*Research program administration, *Air force research), Problem solving, Social communication, Costs, Identification, Analysis.
Identifiers: Research management.

The guide provides description of procedures used in an experimental project of the Air Force to identify, describe and document the problems of technological nature encountered or expected in the development of advanced systems or components. The objective of the project was to develop tools and procedures for improved R and D communications between R and D managers, technology users and the scientists and engineers. (Author)

AD-711 388

PROMOTING THE 'D' IN R AND D: DUBIOUS MODELS AND RELEVANT STRATEGIES,

Rand Corp Santa Monica Calif

Hans Heymann, Jr. May 70, 33p Rept no. P-4387

Descriptors: (*Economics, *Turkey), (*Research program administration, Problem solving), (*Management planning, Effectiveness), Agriculture, Foreign policy, Data processing systems, Organizations, Decision making, Government (Foreign), Models (Simulations).
Identifiers: Research and development, Developing countries, *Transfer of technology.

The document is concerned with how relevant the technological development experience of industrially advanced countries is to R and D managers and planners in countries at an early stage of industrialization, such as Turkey. The paper argues that the more sophisticated techniques and approaches of advanced countries have little practical utility to developing such countries. The paper then turns to the more difficult task of finding an R and D strategy that has some genuine relevance to a country like Turkey. (Author)

AD-707 756

COMPUTER NETWORK RESEARCH.

Semiannual technical rept. 15 Aug 69-15 Feb 70,
California Univ Los Angeles Calif Dept of Computer Science
Leonard Kleinrock. 15 Feb 70, 77p
Contract DAHC15-69-C-0285, ARPA Order-1380

Descriptors: (*Data processing systems, Networks), Data transmission systems, Digital computers, Mathematical models, Simulation, Queueing theory, Costs, Optimization, Time sharing, Interfaces.
Identifiers: *Computer networks.

The report presents two papers on the ARPA computer network. The first dwells on analytic and simulation models suitable for computer network design. The second effort emphasized here is that of the HOST-HOST communication protocol in the ARPA network (HOST is a computer system which is a member of the ARPA network).

AD-705 149

THE NATION'S R AND D EFFORT.

Handout.

Army Logistics Management Center Fort Lee Va
Alan R. Loper. Dec 69, 30p Rept no. AIM-2416-H
Errata sheet inserted.

Descriptors: (*Scientific research, *United States

Government). (*Economics, *Research program administration), Federal budgets, History, Manpower, Reviews, Predictions, Scientific organizations, Civilian personnel.
Identifiers: *Research and development, *Transfer of technology.

A summary is provided of the research and development in the U. S. in terms of a brief history, some discussion of the federal organizations involved, some financial and manpower considerations, mention of the transfer of defense technology to the civilian sector, and a forecast of subjects for attention. (Author)
AD-704 364

OPTIMAL CONTROL OF RESEARCH AND DEVELOPMENT EXPENDITURES.

Technical rept.,
Massachusetts Inst of Tech Cambridge Operations Research Center
Carl W. Hamilton. Dec 69, 128p* Rept no. TR-48
AROD-968:57-M
Contract DA-31-124-ARO (D)-209

Descriptors: (*Research program administration, Costs), Mathematical models, Mathematical programming, Statistical distributions, Exponential functions, Decision making, Algorithms, Theses.
Identifiers: Branch and bound method, Kuhn-Tucker theory, Resource allocation, Gamma function, Exponential density functions, Control theory.

A mathematical model is developed to assist the selection and funding of technology projects. The model assigns gamma distributions to the uncertain costs, represents the mission-technology dependencies by parallel-series networks, and considers a weighted sum of mission readiness probabilities as the overall objective. Optimization requires the solution of a mathematical program with a nonconcave objective function and linear constraints. In the single period case, a branch and bound algorithm is developed to find the globally optimal allocation. In the multiperiod case a complete solution can be determined when all costs are exponentially distributed. As the number of projects increase and the planning period lengthens, special decomposition techniques are required and are developed from the theory of discrete optimal control. (Author)
AD-702 918

QUESTIONS ON ECONOMICS AND PLANNING OF SCIENTIFIC RESEARCH (COLLECTION OF ARTICLES).

Foreign Technology Div Wright-Patterson AFB Ohio
L. S. Blyakhman, A. P. Solovov, P. Ya. Oktyabrskii, I. S. Minko, and M. A. Yudelevich. 16 Oct 69, 287p Rept no. FTD-MT-24-195-69
Edited machine trans. of mono. Voprosy Ekonomiki i Planirovaniya Nauchnykh Issledovaniy, n.p., 1968 p1-198.

Descriptors: (*Scientific research, *Management planning), (*Research program administration, Economics), Budgets, Automation, Personnel management, Government (Foreign), USSR.
Identifiers: Translations.

Questions on the economics of science and training of cadres of specialists are investigated, analysis of the economic work of scientific establishments is provided, indices of appraisal of their activity are offered, and means of increasing scientific research work are set forth. In this volume questions are raised connected with the change over of Scientific Research Institutes, Design-Construction Organizations, and higher educational institutions to full or limited cost accounting, formation of scientific-industrial combines the development of objec-

tive criteria for appraisal of the activity of scientists. Proposals on economic experiments in the scientific establishments and higher educational institutions of Leningrad are generalized. (Author)
AD-701 031

WHAT DO WE MEAN BY 'RESEARCH AND DEVELOPMENT'.

Rand Corp Santa Monica Calif
David Novick. 25 Aug 59, 51p Rept no. P-1779

Descriptors: (*Scientific research, Statistical analysis), Reviews, Economics, Predictions, Industries, Costs.
Identifiers: *Research and development.

Contents: Science, research and development (science, application and certainty); Each step: Its promise and demands (milestones in fission, science and laboratory, distribution of effort); Available statistical data.
AD-700 756

EVALUATION OF R AND D ORGANIZATIONS.

Management analysis note.
Office of the Director of Defense Research and Engineering Washington D C Office for Lab Management
E. M. Glass. 31 Jul 69, 11p Rept no. MAN-69-3

Descriptors: (*Department of Defense, *Research program administration), Organizations, Management engineering, Effectiveness.

One of the problems identified by the Director of Defense Research and Engineering, in his high-priority effort to strengthen the Department of Defense in-house laboratories, concerned the evaluation of research and development organizations. The report describes a peer rating experiment which was an attempt to gain greater insight into the relationship of management and organizational performance with organizational characteristics. (Author)
AD-697 343

M4 MANAGEMENT TOOLS & TECHNIQUES

DEVELOPING CORPORATE STRATEGY THROUGH PLANNING, PROGRAMMING, AND BUDGETING.

Rand Corp Santa Monica Calif
L. A. Dougharty. Oct 70, 17p Rept no. P-4451

Descriptors: (*Organizations, Management planning), (*Industrial relations, Effectiveness), Decision making, Budgets, Mathematical models, Factor analysis, Substitutes.
Identifiers: *Planning programming and budgeting, Corporations.

The corporation needs a planning framework that aids in clarifying objectives, identifying the alternatives open to the firm, and measuring the effectiveness of those alternatives toward the attainment of the objectives of the corporation. To examine how PPB can be of use in the development of corporate strategy, it is necessary to review its most important features. One such review is presented. The concepts of PPB are then applied in the construction of a planning framework for a corporation. (Author)
AD-713 834

A SIMULATION OF MANPOWER ALLOCATION POLICIES AT A MAINTENANCE DEPOT.

Technical rept.,
Florida Univ Gainesville Dept of Industrial and Systems Engineering
J. F. Burns, and J. C. Downey. Jun 70, 116p* Rept no. THEMIS-UF-TR-44 AROD-T-1:61
Contract DAHC04-68-C-0002

Descriptors: (*Manpower, Optimization), (*Personnel management, Mathematical models), (*Supply depots, Maintenance personnel), Simulation, Maintenance, Industrial relations, Management planning, Systems engineering, Cost effectiveness, Programming (Computers), Job analysis, Flow charting.
Identifiers: Policymaking, *Manpower allocation models, Management information systems, Themis project, Dynamo 2 programming language.

A study is reported of the dynamic nature of manpower allocation at a military maintenance depot. The investigation was simulated using some of the basic principles of industrial dynamics. DYNAMO 2 (DYNAMIC MODELS) is used as the simulation language. The results of the investigation indicate that, within the given organization, manpower planning and allocation are related to meeting schedule demands and maintaining reasonable levels of cost in producing a product or service. This report also shows that the industrial dynamics technique can be utilized effectively to present various alternatives in manpower planning to management. The basic structure of the model presented may be adapted to a variety of military and industrial systems. (Author)
AD-713 389

DERIVATION OF ADDITIONAL PROBABILISTIC INFORMATION FOR ANALYZING DECISIONS UNDER RISK.

Master's thesis,
Naval Postgraduate School Monterey Calif
John Patrick Dowling, Jr. Sep 70, 41p

Descriptors: (*Decision theory, Management planning), Statistical analysis, Inventory analysis, Probability, Mathematical models, Problem solving, Theses.
Identifiers: Risk, News boy problem, Profits, Benefit cost analysis, Management information systems.

The problem of analyzing decisions under risk is investigated. The vehicle for this investigation is the single-period inventory model commonly referred to as the newsboy problem. The maximum expected value of the profit is the criterion most often used in making a decision in this type of problem. The paper analyzes this model in several ways. Appropriate display of additional information allows the decision maker to implicitly assign his utilities in terms of his preferences when making decisions under risk. A modification of the expected utility function is also discussed. (Author)
AD-713 050

RESOURCE ALLOCATION IN A SEQUENTIAL FLOW PROCESS WITH AN APPLICATION TO THE NAVAL RESUPPLY SYSTEM.

Center for Naval Analyses Arlington Va
Lester P. Silverman. Oct 70, 26p Rept no. CNA-Professional Paper-47

Descriptors: (*Naval procurement, Optimization), (*Spare parts, Systems engineering), Logistics, Management planning, Processing, Transportation, Costs, Distribution functions, Stochastic processes, Sequences, Mathematical models, Budgets.
Identifiers: Benefit cost analysis, Management information systems, Requisitions.

The paper considers the problem of optimizing the benefits to be realized from allocating resources in a stochastic flow process. The Naval resupply system is viewed as consisting of several processes, from the requisitioning, to processing, to transportation of spare parts. The time necessary for completion of any of the processes by any of the assumed homogeneous items is a random variable described by a distribution function whose parameters are functions of the budget at which each process is supported. Having delineated alternative budget levels and associated parameter improvements at each stage, the problem is to allocate a fixed budget so that the probability of completion for any item over the whole flow system before a given deadline is maximized. The solution to this problem is presented with specific reference to the Naval resupply system. (Author)
AD-713 028

THE MAN-MACHINE INTERFACE FOR 1990 MANAGEMENT INFORMATION SYSTEM DISPLAYS,

Army Advanced Materiel Concepts Agency Washington D C
Howard J. Vandersluis. Sep 70, 45p Rept no. AMCA-71-006
Report of Ad Hoc Working Group No. 17.

Descriptors: (*Combat information centers, *Display systems), (*Man-machine systems, Combat information centers), Management engineering, Information retrieval, Programming (Computers), Stress (Psychology), Substitutes, Threat evaluation, Interfaces, Adaptive systems, Sequences, Problem solving, Reviews.
Identifiers: *Management information systems, Evaluation, Scenarios.

An ad hoc working group (AHWG) was convened to determine what computer-associated display technology should be brought to bear to extend and expand the capabilities of high-level field commanders and their staffs. To focus the study, the 'commander' was assumed to be the commander in chief of a theater of operations; and only his functions relating to combat service support were considered. The AHWG considered formats, flexibility, adaptability, dynamics, predictive capability, directive functions, credibility considerations, and operating characteristics of displays. The report of the AHWG describes the development of a methodology for analyzing the display requirements of the commander. The methodology begins with development of scenarios representative of the principal command-and-control problems of high-level commanders. For each scenario, human and environmental constraints are listed. By comparing these constraints, information-display requirements are derived. The report describes the group's use of the methodology through one complete scenario and lists the display requirements that were derived. (Author)
AD-712 998

INTEGRATED PLANNING SYSTEMS.

Technical rept.,
Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
Robert W. Blanning. Sep 70, 123p Rept no. 71-07
Contract N00014-67-A-0216-0007

Descriptors: (*Management planning, *Linear programming), Economics, Industries, Manufacturing methods, Transportation, Costs, Cost effectiveness, Iterative methods, Computer programs, Nonlinear programming, Dynamic programming.
Identifiers: Marketing, Prices, *Integrated planning systems, Investments.

The report is a discussion and evaluation of a set of preliminary experiments designed to yield in-

sight into the development of integrated planning methods and into the design of experiments to demonstrate and test these methods. Five sets of experiments were performed consisting of: Integrating a linear programming model of a transportation network with nonlinear purchasing cost functions; Integrating two linear programming models of manufacturing facilities with a simulation of a warehouse; Integrating the pricing policies of five retail outlets; Integrating simplified purchasing, manufacturing, and marketing models; Integrating a strategic system for selecting investment projects with a simplified tactical system for yearly operations. Programs for the experiments are also presented. (Author)
AD-712 558

A REVIEW AND ANALYSIS OF STATISTICAL COST ESTIMATING RELATIONSHIPS.

Master's thesis,
Naval Postgraduate School Monterey Calif
Marshall Nichols Carter. Apr 70, 43p

Descriptors: (*Operations research, Cost effectiveness), (*Weapon systems, Government procurement), (*Costs, Mathematical prediction), Regression analysis, Monte Carlo method, Contracts, Sampling, Decision theory, Simulation, Theses.
Identifiers: Cost estimating relationships, *Cost analysis.

Statistical cost estimating relationships (CER) are used by cost analysts for estimating future systems costs before the costs are incurred. A sample of published studies concerning CER's is reviewed and analyzed and a general prognosis of the techniques involved is presented. Some currently used alternatives to CER's are discussed and methods of improving cost estimating relationships are examined. Major conclusions are that the technique of estimating costs through statistical relationships is sound but that improvements can be realized in certain areas. (Author)
AD-712 463

A MONTE CARLO PERT ANALYSIS SYSTEM UTILIZING THE GRAPHIC DISPLAY OF AN IBM 360 COMPUTER.

Masters' thesis,
Naval Postgraduate School Monterey Calif
Robert A. Kottke, Jr. Jun 70, 95p

Descriptors: (*Programming (Computers), Operations research), (*Management planning, Flow charting), Monte Carlo method, Networks, Random variables, Graphics, Display systems, Design, Theses.
Identifiers: *PERT, IBM 360/67 computers, Computer graphics.

A system for PERT analysis using Monte Carlo methods to estimate project completion times was designed using a 2250 Display Unit operating on an IBM 360/67 computer. The user enters the PERT network and the distributions of activity times by using the light pen on the 2250 Display Unit. After the computer performs the analysis, the probability of being on the critical path is shown for each arc in the network and a histogram of project completion times is displayed. The user may then modify the network and run another analysis. A discussion of the difference between this Monte Carlo PERT analysis and the usual PERT analysis and details of the implementation is included, along with operating instructions for the program. A user with no programming experience on the 2250 Display Unit can utilize the program by following the operating instructions. (Author)
AD-712 461

A METHODOLOGY FOR COST FACTOR COMPARISON AND PREDICTION.

Rand Corp Santa Monica Calif
Alvin J. Harman, and Susan Henrichsen. Aug 70,
80p Rept no. RM-6269-ARPA
Contract DAHC15-67-C-0141, ARPA Order-189-1

Descriptors: (*Air Force procurement, Weapon systems), (*Cost effectiveness, Management planning), Aircraft, Guided missiles, Costs, Mathematical prediction, Contracts, Statistical analysis, Reviews, Mathematical models.
Identifiers: Methodology, Evaluation, *Management information systems.

An improved technique is reported for analyzing the cost experience of weapon system procurements. Unlike earlier analyses, this one accounts for performance requirements, program duration, degree of technological advance, level of effort, earliness of estimates, and subsequent program changes, as well as the more usual ratio of estimated to actual costs (cost factors). Fifteen weapons for which enough information was available were analyzed and the results were compared with 1950s aircraft and missile experience. Based on an assessment of the technological advance and length of time for development of a future system, the actual cost and range of uncertainty can be predicted using this mode.
AD-712 457

A MODEL OF THE PLANNING, PROGRAMMING, AND BUDGETING PROBLEM.

Master's thesis,
Naval Postgraduate School Monterey Calif
Robert Stephen Brent. Jun 70, 62p

Descriptors: (*Department of Defense, *Management planning), Federal budgets, Decision making, Mathematical models, Iterative methods, Efficiency, Cost effectiveness, Theses.
Identifiers: Planning programming and budgeting systems, Systems analysis, Alternatives, Benefit cost analysis.

A model of the planning, programming, and budgeting problem is formulated. The variables of the model are resources, elements, characteristics, benefits (measures of effectiveness), and costs. The nature of the PPB problem requires that the model incorporate multiple measures of benefit and cost. To characterize efficient choices in the PPB context decision rules which are necessary and sufficient for efficiency are derived. Discounting of benefits over time is discussed. Sensitivity analysis of the model is performed. Decentralization possibilities in the model are explored. (Author)
AD-712 455

AN EXPANSION OF THE IMPROVEMENT CURVE TO ALLOW ITS USE WITH A COMMON/PECULIAR PRODUCTION MIX,

Aeronautical Systems Div Wright-Patterson AFB Ohio Directorate of Advanced Systems Planning
W. W. Baker, and J. Silver. Mar 67, 21p

Descriptors: (*Management planning, Production control), Curve fitting, Manufacturing methods, Costs, Decision making, Programming (Computers), Cost effectiveness.
Identifiers: Management information systems.

The technique developed in the course of the study and which has been reported herein appears to have distinct advantages in the development and maintenance of a more accurate estimate of the labor required for a multi-model program. There are four major advantages of the technique. It has greater inherent accuracy due to the intense scrutiny of each component and the changes required for each model. Secondly, configuration changes are directly relatable to components and thus are reflected in the cost. Thirdly, there is an

immediate benefit from the mandatory requirement that a computer program be used to perform the necessary calculations. This provides quick reaction capability for obtaining the cost effect of schedule and technical changes. Lastly, commonality indices are eliminated and all aspects of commonality are directly relatable to cost. (Author)
AD-712 381

A PRELIMINARY INQUIRY INTO THE SOFTWARE ESTIMATION PROCESS,
Rand Corp Santa Monica Calif
J. A. Farquhar. Aug 70, 57p Rept no. RM-6271-PR
Contract F44620-67-C-0045

Descriptors: (*Programming (Computers), Time studies), Mathematical prediction, Cost effectiveness, Efficiency, Data processing systems, Air Force.
Identifiers: *Software estimation.

The report reviews the literature of software estimation and reports a small experiment comparing Delphi with face-to-face group judgment to predict the time necessary to program an information system—in this case, the Air Force's PDSO (Personnel Data System—Officers). Planning software production is necessary but almost impossible at present. Cost to completion depends on many factors, some unknown at the time and all hard to quantify (the difficulty of the task, the programmer's ability and familiarity with the procedures involved, the degree of definition provided him, and about 80 other factors). The experiments undertaken failed to establish the utility of either estimation method. Primary recommendations for further research are: (1) more effective data collection, (2) analysis of characteristics of good estimators, and (3) formal inquiry into the techniques used by estimators. (Author)
AD-712 052

INFORMATION SYSTEM DESIGN METHODOLOGY BASED ON PERT/CPM NETWORKING AND OPTIMIZATION TECHNIQUES.
Final rept. 15 Apr 68-1 Aug 70,
Pittsburgh Univ Pa Graduate School of Library and Information Sciences
Anindya Bose. 1970, 230p
Contract N00014-67-A-0402-0004
Doctoral thesis.

Descriptors: (*Information retrieval, Operations research), Systems engineering, Optimization, Costs, Design, Monitors, Theses.
Identifiers: *Information systems, PERT, Critical path method, PILL programming language, IBM 360 computers, IBM 350 computers.

The dissertation attempts to demonstrate that the Program Evaluation and Review Technique (PERT)/Critical Path Method (CPM) of some modified version thereof, can be developed into an information system design methodology. The methodology utilizes PERT/CPM which isolates the basic functional units of a system and sets them in a dynamic time/cost, precedence and dependency interrelationship network. To monitor the internal activity of the basic functional units, the methodology applies assignment and sequencing algorithms. By providing the means to control the time, cost, assignment, and sequencing of the activities of the basic functional units in a continuous manner, and a way to network them into the desired system, the methodology fulfills the need for a continuous monitoring information system design methodology. An interactive mode PERT computer program was written in PILL, which runs on the IBM 360/50 Pitt Time Sharing System using the 2741 Terminal. (Author)
AD-711 670

AN EFFICIENT ALGORITHM FOR SCHEDULING INDEPENDENT TASKS.

Technical rept.,
Auburn Univ Ala
L. J. Wilkerson, and J. D. Irwin. Aug 70, 101p Rept no. THEMIS-AU-T-15
Contract DAAH01-68-C-0296
Report on Information Processing.

Descriptors: (*Programming (Computers), Scheduling), Optimization, Decision making, Management planning, Dynamic programming, Set theory, Computer programs, Theorems, Algorithms.
Identifiers: Themis project, Parallel processors, Multiprocessing, Task scheduling, Due dates.

An algorithm is developed for sequencing an independent task set, characterized by deterministic processing times and due dates, on a single processor so that total tardiness is minimized. The tasks are assumed to have a loss function of the form $\max(0, (c \text{ sub } i) - (d \text{ sub } i))$ where $c \text{ sub } i$ is the calendar completion time of task i and $d \text{ sub } i$ is its due date. The method is in general suboptimal, but conditions are given for which an optimal schedule is always obtained. In addition, a technique is presented for improving suboptimal solutions by interchanging certain non-adjacent pairs of tasks. Finally, this scheduling technique is applied to the multiple processor case. (Author)
AD-711 543

A MANAGEMENT TECHNIQUE FOR IN-HOUSE RESEARCH PROGRAMS,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
T. J. Baker. Jan 70, 19p*
Contract AFFDL-MR-70-1

Descriptors: (*Research program administration, Operations research), Costs, Manpower, Management planning.
Identifiers: Research management.

The technique has been utilized principally by in-house efforts involving two or three manyears of efforts and small facilities. The technique could be applied to large team efforts but modification would be required. The discussion starts with the initial request from the engineer and each step of the approval and documentation mechanism is covered, including the forms utilized, and ends with a discussion of the display system utilized by management for following progress on each effort. Brief comments are made as to certain fringe benefits which accrue from this technique. Conclusions regarding other needs for management techniques are presented. (Author)
AD-711 382

AUTOMATIC DATA PROCESSING RESOURCE ESTIMATING PROCEDURES (ADPREP).

Final rept.,
Planning Research Corp McLean Va
Silvio Pelosi, Bill Parham, John Berterman, and Arlen Feldman. Aug 70, 110p Rept no. PRC-R-1527
Contract DAHCl5-69-C-0343

Descriptors: (*Data processing systems, Logistics), Information retrieval, Operations research, Decision making, Management planning.
Identifiers: ADPREP (Automatic Data Processing Resource Estimating Procedures), Automata data processing resource estimating procedures.

The objectives of the project were to determine the feasibility of collecting US Army experience data relative to the development, operation, and maintenance of computer application programs; and having done so, to collect and analyze data for developing estimating relationships. The project's

report is organized in four volumes. The first volume summarizes the history of the project, presents the findings, conclusions and recommendations, and describes the results and methodology. The other three volumes contain the systems descriptions, the resource estimating procedures and the data collection plan. (Author)
AD-711 117

DEVELOPMENT OF A RECOMMENDATION BLANK TO AID IN THE SELECTION OF SCIENTIFIC AND TECHNICAL PERSONNEL,
Richardson Bellows Henry and Co Inc New York
Harold A. Edgerton, Marion W. Richardson, and James W. Campbell. Jun 49, 38p
Contract N7onr-422

Descriptors: (*Scientific personnel, Selection), Performance (Human), Reviews, Classification, Records, Reports, Attitudes.
Identifiers: Recommendation blanks, Evaluation.

Selection and placement officers frequently have commented on the lack of value of the usual letters of recommendation and reference forms. Such letters are too frequently characterized by generalities and stereotyped phrases with little or no information useful in evaluating the applicant's fitness for the job. To meet the need for usable references on applicants for scientific and technical positions, arrangements were made to develop and validate an objective and scorable reference form. Three forms of objectively scored recommendation blanks were constructed and validated. Suitable scoring keys were constructed for each form. Most persons should be able to complete the recommendation form for an applicant in less than twenty minutes.
AD-710 684

NEW SYSTEMS PERSONNEL REQUIREMENTS DATA SYSTEM (NSPRDS) COMPUTER SOFTWARE SUBSYSTEM DEVELOPMENTS.

Research memo.,
Naval Personnel and Training Research Lab San Diego Calif
Robert C. Megling. Jul 70, 36p Rept no. SRM-71-3

Descriptors: (*Human engineering, Information retrieval), (*Naval personnel, Data processing systems), Personnel management, Data storage systems, Programming (Computers), Management planning, Input-output devices, Man-machine systems, Training, Time, Effectiveness.
Identifiers: Data banks, NSPRDS (New Systems Personnel Requirements Data System), New systems personnel requirements data system.

A new personnel requirements system is being developed for the orderly generation, maintenance, updating, and application of detailed task analysis information throughout the development cycle of Navy weapon and support systems. The purpose of the research reported herein was to evaluate the applicability of the system, to manipulate human factors data in a modern computer environment. (Author)
AD-710 396

THE FILE SEARCHING, RECORD VALIDATING AND RECORD FORMATTING FUNCTIONS OF THE SUPERVISOR FOR AN EXTENDED DATA MANAGEMENT FACILITY.

Technical rept.,
Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
Agu Raymond Ets. Aug 70, 110p Rept no. 71-04
Contract N00014-67-A-0216-0014

Descriptors: (*Programming (Computers), *Information retrieval), Time sharing, Data storage

systems, Records, Search theory, Design.

Identifiers: List processing, Data management, Supervisor computer code.

The purpose of the Supervisor in an Extended Data Management Facility (EDMF) is to direct the Facility's handling of a user's request for service. The Supervisor employs the five main functions of Access Controlling, Retrieval Optimizing, File Searching, Record Validating and Record Formatting in order to accomplish its task. The report is concerned mainly with the design and implementation of the File Searching and Record Validating Functions, although it also covers the Record Formatting Function. The File Searching and Record Validating Functions form that part of the Supervisor which actually controls the retrieval of records from the files of the EDMF. The major part of the report is concerned with discussing the File Searching Function because of the novel feature which was implemented. This feature is the parallel processing of record lists in a generalized file structure, which eliminates redundant retrievals while at the same time reducing the access time of the device on which the records are stored. The Record Validating Function checks the record for compliance with the user's request and verifies the user's authority to access the record. A validated record is then subject to the Record Formatting Function which outputs it to the user. (Author)
AD-710 386

ECONOMIES OF SCALE IN COMPUTER USE: INITIAL TESTS AND IMPLICATIONS FOR THE COMPUTER UTILITY.

Doctoral thesis,
Massachusetts Inst of Tech Cambridge
Lee L. Selwyn. Jun 70, 114p Rept no. MAC-TR-68
Contract Nonr-4102 (01)

Descriptors: (*Computers, Economics), (*Data processing systems, Cost effectiveness), Management planning, Time sharing, Optimization, Mathematical models, Regression analysis, Statistical data, Reviews, Theses.
Identifiers: Management information systems, Computer utility, Economies of scale, MAC project.

The study is concerned with the existence of economies of scale in the production of data processing and other computing services, and the possible regulatory and public policy implications of such economies. An analysis was made of data on nearly 10,000 computers installed at firms in manufacturing industries, using the survival technique, which uses market experience as a basis for studying levels of optimum plant size. The results of this analysis suggested that users did operate computers as if there were significant economies of scale in their use. (Author)
AD-710 011

PROBABILISTIC FORECASTS AND REPRODUCING SCORING SYSTEMS,
Rand Corp Santa Monica Calif
Thomas A. Brown. Jun 70, 64p Rept no. RM-6299-ARPA
Contract DAHC15-67-C-0141, ARPA Order-189-1
See also AD-690 498, AD-690 988, AD-698 735, and AD-702 790.

Descriptors: (*Decision making, Group dynamics), Probability, Military strategy, Economics, Statistical analysis.
Identifiers: Delphi method.

The report discusses ways to exploit in probabilistic terms the judgment of experts on political, economic, or military problems--frequently the best information available. The memorandum considers ways to structure an incentive system in order to elicit the best possible probabilistic

forecasts and touches on methods for combining several into consensus forecasts. Personal estimates, inherently uncertain, should be couched in probabilistic terms. Such an approach provides a concise expression of subjective uncertainty, an operational self-rating of confidence in the forecast, and readily usable data for decision-theoretic models and for combination with similar forecasts. 'Reproducing scoring systems' are those free of incentives to distort by exaggeration or understatement. In political, economic, and military forecasts, however, these systems may not encourage forecasters to maximize their expected gains, may be polluted by conflict of interest, and may require many forecasts to distinguish the accurate from the inaccurate forecasters. (Author)
AD-709 906

LOG-NORMAL DISTRIBUTION ANALYSIS OF THE AEROSPACE RESEARCH PROJECTS.

Special rept.,
Office of Research Analyses Holloman AFB N Mex
Eugene Kosik. Apr 70, 40p* Rept no. ORA-70-0004

Descriptors: (*Scientific research, Federal budgets), (*Costs, Statistical analysis), (*Air Force research, *Research program administration), Army research, Naval research, Statistical data, Probability density functions, Curve fitting, Mathematical models.
Identifiers: Lognormal distribution, Management information systems, *Aerospace research.

The purpose of the study is to determine whether OAR research projects follow the log-normal distribution pattern found by B. V. Dean for the U. S. Army and Navy research project costs. The log-normal probability distribution would provide a model to measure research management performance which could be used to evaluate management efficiency and aid in improving the research planning and budgeting process. A simple factor analysis with orthogonal rotations performed on five of OAR's work unit parameters - fiscal year dollars, man years, total dollars, total duration and annual rate - indicated that fiscal year dollars was a highly significant factor. Therefore, 1968 and 1969 costs for 18 ORA, 48 ARL, and 289 AFRL work units were analyzed and compared to log-normal probability distributions with the same means and standard deviations as the data. The goodness of fit in each case was checked by plotting the data on log-normal probability paper and also by comparison with appropriate chi-square statistics. The goodness of fit is discussed and recommendations for further study of the data are made. (Author)
AD-709 867

THE MEASUREMENT AND DEVELOPMENT OF MANAGEMENT INFORMATION SYSTEMS.
Final rept. Sep 70,
Princeton Univ N J Dept of Psychology
Harold M. Schroder. Sep 70, 24p*
Contract N00014-67-A-0151-0020

Descriptors: (*Management engineering, Data processing systems), Decision making, Organizations, Group dynamics, Uncertainty, Interactions, Curve fitting, Feedback, Attitudes, Statistical processes, Environment, Measurement, Growth.
Identifiers: *Management information systems, *Information processing.

The focus is on the application of information processing variables to the study of management information systems. A management information system is evaluated by: The range of relevant information used in decision-making, the number of

different conceptions generated re: informational feedback, and the degree to which alternative perspectives are used in decision-making. In combination, these output measures define the information processing capacity of an organization and are strongly associated with effective decision-making in complex tasks. (Author)
AD-709 412

COMPUTER-AUGMENTED MANAGEMENT-SYSTEM RESEARCH AND DEVELOPMENT OF AUGMENTATION FACILITY.

Final technical rept. 8 Feb 68-8 Feb 70,
Stanford Research Inst Menlo Park Calif
D. C. Engelbart. Apr 70, 281p RADC-TR-70-82
Contract F30602-68-C-0286, ARPA Order-0967

Descriptors: (*Data processing systems, Reviews), (*Programming (Computers), Reviews), Information retrieval, Management control systems, Real time, Time sharing, Compilers.
Identifiers: On line systems.

The report covers two years of research in a continuing program in the Augmentation Research Center (ARC) of the Information Sciences Laboratory of Stanford Research Institute. The research reported is aimed at the development of on-line computer aids for increasing the performance of individuals and teams engaged in intellectual work, and the development of techniques for the use of such aids. The report covers hardware and software development; applications in several areas relating to management of a community of workers who use on-line aids and to information management for such a community, participation in the ARPA computer network, and a summary of plans for the continuation of the research. (Author)
AD-709 211

LEARNING-CURVE TABLES: VOLUME III. 86-99 PERCENT SLOPES,
Rand Corp Santa Monica Calif
H. E. Boren, Jr., and H. G. Campbell. Apr 70, 287p
Rept no. RM-6191-PR-Vol-3
Contract F44620-67-C-0045
See also Volume 1, AD-708 713 and Volume 2, AD-708 714.

Descriptors: (*Cost effectiveness, Management planning), (*Learning curves, Tables), Statistical analysis, Curve fitting.
Identifiers: *Cost analysis.

The document contains volume 3 of three volumes of learning-curve data, including unit curve midpoints for plotting first-lot quantities.
AD-709 178

ILS DEVELOPMENT AND IMPLEMENTATION,
Naval Ship Systems Command Washington D C
Richard Dangel. 1970, 47p
Presented at the Annual Technical Symposium of Association of Senior Engineers (7th), 1970. See also Annual technical symposium no. 6, AD-707 726.

Descriptors: (*Instrument landings, Instrumentation), Shipborne, Training, Management engineering, Maintenance, Logistics, Cost effectiveness, Specifications.

The report examines progress and problems in Integrated Logistic Support development and implementation during 1969, in the U. S. Naval Ship Systems Command. It contains discussions in five major areas: (1) How ILS is being implemented on a major ship system acquisition (2) Development and highlights of the recently issued Maintenance Engineering Analysis Specification MIL-M-24365 (SHIPS) 26 May 1969; (3) Progress and planning

for ILS training and ILS career management program; (4) How NAVSHIPS is organized for ILS, changes made and changes recommended; and (5) Remaining problems in ILS implementation. (Author)
AD-709 123

LEARNING-CURVE TABLES: VOLUME II. 70-85 PERCENT SLOPES.
Rand Corp Santa Monica Calif
H. E. Boren, Jr., and H. G. Campbell. Apr 70,
325p* Rept no. RM-6191-PR-Vol-2
Contract F44620-67-C-0045
See also Volume I, AD-708 713.

Descriptors: (*Cost effectiveness, Management planning), (*Learning curves, Tables), Value engineering, Economics.
Identifiers: *Cost analysis.

The report comprises Volume 2 of a three volume series of learning-curve data, including unit curve midpoints for plotting first-lot quantities. Accurate representation of the first-lot quantity is important, because misplacing this point could lead to incorrect conclusions about the cost-quantity relationship. In the past, unit curve midpoints were estimated by various approximation methods because the calculations to obtain tables of true midpoints were complex and laborious. Now, through use of high-speed computers, such calculations can be made quickly and inexpensively. Accordingly, these volumes were prepared to assemble all the information a cost analyst is likely to need in using or plotting learning-curve data. This material was prepared for use in all Air Force cost analysis activities and should also be useful to the other services and the aerospace industry. (Author)
AD-708 714

LEARNING-CURVE TABLES: VOLUME I. 55-69 PERCENT SLOPES.
Rand Corp Santa Monica Calif
H. E. Boren, Jr., and H. G. Campbell. Apr 70,
323p* Rept no. RM-6191-PR-Vol-1
Contract F44620-67-C-0045
See also Volume 2, AD-708 714.

Descriptors: (*Cost effectiveness, Management planning), (*Learning curves, Tables), Value engineering, Economics.
Identifiers: *Cost analysis.

The report comprises volume 1 of a three volume series of learning-curve data, including unit curve midpoints for plotting first-lot quantities. Accurate representation of the first-lot quantity is important, because misplacing this point could lead to incorrect conclusions about the cost-quantity relationship. In the past, unit curve midpoints were estimated by various approximation methods because the calculations to obtain tables of true midpoints were complex and laborious. Now, through use of high-speed computers, such calculations can be made quickly and inexpensively. Accordingly, these volumes were prepared to assemble all the information a cost analyst is likely to need in using or plotting learning-curve data. This material was prepared for use in all Air Force cost analysis activities and should also be useful to the other services and the aerospace industry. (Author)
AD-708 713

PROJECT ABLE AND PARALLEL DEVELOPMENT.

Operations analysis rept.,

Air Force Logistics Command Wright-Patterson AFB Ohio Operations Analysis Office
Irving Katz. May 70, 10p Rept no. OAR-8-Suppl-2
Supplement no. 2 to report dated Jan 70, AD-700 986.

Descriptors: (*Air force procurement, *Management engineering), Contracts, Costs, Weapon systems, Decision making, Air force budgets.
Identifiers: ABLE project, Logistics management, Tradeoffs.

An adaptation of Project ABLE is presented which is tailored for systems developed through parallel prototypes. In this approach, the explicit quantification of the 'logistic effects' of the development is deferred until the prototypes have been developed and tested and the production contract is being processed. The motivation to consider logistics during design is nevertheless emphasized. It is accomplished by making it clear to the developers that in the selection of a production source there will be substantial emphasis on the calculation of life cycle costs. These will include the prediction and subsequent verification of 'logistic effects,' and will be assessed during source selection through use of data acquired from testing of the prototypes. (Author)
AD-707 851

INTEGRATED LOGISTIC SUPPORT IMPLEMENTATION IN THE NAVAL SHIP SYSTEMS COMMAND.

Naval Ship Systems Command Washington D C
Richard Dangel. 1969, 35p
Presented at the Annual Technical Symposium of Association of Senior Engineers (6th), 1969.

Descriptors: (*Naval operations, *Logistics), (*Management planning, Handbooks), Maintenance, Personnel management, Spare parts, Data processing systems, Test equipment, Naval equipment, Military facilities, Costs, Contracts, Life expectancy, Specifications, Standardization.
Identifiers: *Integrated logistic support, *Logistics management.

The document is designed to give a fairly comprehensive summary of ILS implementation within the Ship Systems Command. The first portion contains a brief review of the pertinent directives, instructions and guides. The second and prime section tells how theory and management policy are put to actual practice. The final section imports some insight into one of the major tools, the maintenance engineering analysis. (Author)
AD-707 726

A PILOT SYSTEM TO IMPROVE PREDICTION PARAMETERS AT A NAVAL AIR REWORK FACILITY AND TO COMPARE PLANS WITH PERFORMANCE.

Logistics Management Inst Washington D C

Feb 70, 112p Rept no. LMI-69-12
Contract SD-271

Descriptors: (*Management planning, Logistics), (*Naval research, Data processing systems), Mathematical prediction, Naval air stations, Programming (Computers), Correlation techniques, Maintenance, Personnel management, Naval procurement, Organizations, Scheduling.
Identifiers: *Logistics management, Management information systems, *Workload forecasts.

The report describes a computer-based system designed to improve workload forecasts at a Naval air rework facility (NARF). This system compares workload forecasts with actual performance and utilizes exponentially smoothed performance data to improve future workload forecasts. It supplements an operational workload forecast system previously developed. (Author)
AD-707 725

HUMAN-COMPUTER INTERACTIONS INVOLVED IN ANALYSIS OF CAI DATA.
Florida State Univ Tallahassee Computer-Assisted Instruction Center
Duncan N. Hansen, James Papay, Harold F. O'Neil, Jr., and Dave Danner. 30 Jun 70, 24p Rept no. CAI-Systems Memo-6
Contract N00014-68-A-0494

Descriptors: (*Programmed instruction, *Man-machine systems), Computers, Job analysis, Data, Analysis, Interactions, Performance (Human), Computer personnel.
Identifiers: CAI (Computer Aided Instruction), (*Computer aided instruction).

The world of Computer-Assisted Instruction (CAI) involves a set of complex multi-role human computer interactions. One important aspect of this human computer interaction concerns the analysis of response data for scientific or instructional purposes. The paper describes the human computer operational interactions that the personnel at the Florida State University CAI Center, have found necessary to efficiently analyze CAI data. The roles of critical personnel and processes that are allowed for implementation of a data analysis request are specified in detail. The paper also attempts to characterize how a data analysis request moves for initial verbal input request from a user to system personnel, through machine processing, and finally to some form of output to the user. (Author)
AD-707 714

TIME-SHARING INVENTORY ANALYSIS (RCTVIC13).

Operations analysis technical memo.,
Air Force Logistics Command Wright-Patterson AFB Ohio Operations Analysis Office
Richard C. Trepp, and Victor J. Presnitz, Jr. Jun 70, 28p Rept no. OATM-11

Descriptors: (*Inventory analysis, Computer programs), Mathematical models, Time sharing, Optimization.
Identifiers: RCTVIC13 computer program, BASIC programming language.

Despite the abundance of literature concerned with inventory theory, there remains a disturbing gap between the theory and its application. This gap is created by the inability of straight mathematical analysis to answer all relevant questions preceding acceptance of new approaches. For this reason, it is imperative that the analyst find additional means to assess the implications to the existing inventory system of the formulae derived from his mathematical model. The computer routine, entitled RCTVIC13, which is programmed in BASIC on the RADC 645 Time-Sharing System, provides the analyst and manager with a powerful analytical tool to make just such analyses. The design of inventory policies is facilitated by, and measurement of the performance of the policies necessitates, precise definition of 'measure of effectiveness.' Unfortunately, there is a lack of unanimity at this time as to the preferred measure. It is for this reason that RCTVIC13, for a given safety level dollar investment, examines five safety level policies in terms of four measures of effectiveness. RCTVIC13 is structured such that the user (analyst or manager) may also vary any or all of the parameters which describe his inventory system.
AD-707 096

PREDICTIVE TECHNIQUES STUDY, PHASE I. COMPARISON OF SOME FORECAST METHODS.

05-M4 MANAGEMENT TOOLS & TECHNIQUES

Operations analysis rept.,
Air Force Logistics Command Wright-Patterson
AFB Ohio Operations Analysis Office
M. D. Lum, L. L. Blair, and J. R. Stuart. May 70.
203p Rept no. OAR-10

Descriptors: (*Air Force Logistics Command,
*Management planning), (*Air Force equipment,
Maintainability), (*Inventory control, *Mathe-
matical prediction), Stock level control, Life ex-
pectancy, Replacement theory, Military require-
ments, Spare parts, Lead time, Mathematical
models, Statistical analysis, Effectiveness.
Identifiers: *Management information systems,
*Supply management.

The report discusses the results of the research performed on Phase I of the Predictive Techniques Study. Phase I consisted of a short-term effort to obtain indications whether single or double exponential smoothing, double moving average, or moving least squares are more accurate than single moving average for forecasting. Phase I dealt only with computer generated artificial 'demand patterns'; thirty-nine runs were made on various demand patterns, and the alternative forecast methods evaluated for each run. A unique feature is that varying forecast lead times are taken into account (short-term vs. medium-term vs. long-term). Other parameters being varied include: the exponential smoothing constant alpha, mean demand, variance of demand (random) fluctuation, slope of trend when applicable. (Author)
AD-706 088

COST SENSITIVITY ANALYSIS OF A GROUND SENSOR SYSTEM, Rand Corp Santa Monica Calif K. K. Weaver. Apr 70, 13p Rept no. P4361

Descriptors: (*Combat surveillance, Data trans-
mission systems), (*Enemy personnel, Detection),
(*Systems engineering, *Costs), Statistical analy-
sis, Sensitivity, Correlation techniques, Limited
war, Acoustic detectors.
Identifiers: *Cost sensitivity analysis, Cost analy-
sis.

The purpose of the paper is to describe cost sensitivity analysis and to illustrate its use. Sensitivity analysis is the systematic investigation of the relationship of total system costs and system design and cost parameters. Sensitivity analysis studies the change in total system cost as a result of a change in the cost, operation mode, capability, or other feature of some part of the total system. (Author)
AD-705 983

A METHODOLOGY FOR ESTIMATING EXPECTED USAGE OF REPAIR PARTS, WITH NO USAGE HISTORY, George Washington Univ Washington D C Pro- gram in Logistics Sheldon E. Haber, and Rosedith Sitgreaves. 28 Apr 70, 29p Rept no. Serial-T-233-Rev Contract N00014-67-A-0214

Descriptors: (*Naval equipment, *Spare parts),
(*Inventory, Mathematical prediction), Military
requirements, Stock level control, Mathematical
models, Management planning, Statistical
processes, Distribution functions.
Identifiers: Demand (Economics), Usage estima-
tion, Inventory models.

In the paper a model is presented which focuses on the problem of predicting demands for items with extremely low usage rates. These form the bulk of repair parts in military systems. The basic notion underlying the model is the pooling of usage data for common design items with movement for the

purpose of estimating usage rates for similar items which have shown no movement. A unique feature of the model is that it also makes possible the estimation of usage rates for items newly introduced into a system for which no previous usage history is available. (Author)
AD-705 511

ADP INSTALLATION EMERGENCY PLANNING (CONTINUITY OF OPERATIONS). Task Group rept. Department of Defense Washington D C

Dec 69, 101p

Descriptors: (*Data processing systems, Reliability), Management planning, Protection, Data storage systems, Fires, Failure (Electronics), Vulnerability, Operation.
Identifiers: Emergency planning.

As ADP technology becomes more and more advanced and, as a result, the equipment itself becomes more essential for the normal operation of numerous organizations, an increased emphasis must be placed upon the reliability of the automated systems. There are many areas in which a computer system is highly vulnerable. Representative of these areas are the following four topics: Hardware failure; Power failure; Fire; and Workload surge. (Author)
AD-705 341

EMPIRICAL DEVELOPMENT OF A COMPUTER MANAGED INSTRUCTION SYSTEM FOR THE FLORIDA STATE UNIVERSITY MODEL FOR THE PREPARATION OF ELEMENTARY SCHOOL TEACHERS.

Technical rept.,
Florida State Univ Tallahassee Computer-Assisted
Instruction Center
Edward Newton Hobson. 27 Apr 70, 135p* Rept
no. CAL-TR-8
Contract N00014-68-A-0494

Descriptors: (*Instructors, Training), (*Pro-
grammed instruction, Instructors), Models (Simu-
lations), Management planning, Test construction
(Psychology), Problem solving, Data processing
systems, Statistical analysis, Universities, Florida.
Identifiers: *Computer aided instruction, Eleme-
ntary schools, Individualized training.

The study involved the design, development and prototype implementation of a computerized management system as a subcomponent of the Florida State University's proposed model for training elementary teachers. The problems examined during this investigation consisted of the development of a data acquisition and instructional system (1) to collect reliable data to assess the management system's actual performance and its acceptability by the trainees, (2) to manage a variety of available resources, (3) to schedule trainees' activities, and (4) to monitor each trainee's progress. (Author)
AD-704 912

AUDITING LARGE-SCALE MANAGEMENT INFORMATION SYSTEMS: THE NAVY MAINTENANCE DATA COLLECTION SYSTEM, George Washington Univ Washington D C Lo- gistics Research Project Sheldon E. Haber, Frank W. Segel, and Henry Solomon. 12 Mar 69, 31p Rept no. Serial-T-219 Contract N00014-67-A-0214

Descriptors: (*Management engineering, *Data
processing systems), (*Naval operations, *Main-
tenance), Multivariate analysis, Accuracy.

Identifiers: *Management information systems.

In recent years many large government and commercial organizations have been developing large-scale management information systems. During the early phases of any system development, questions are likely to be raised concerning the criteria of completeness and accuracy of the data. How to respond to these questions is difficult, and represents the general subject of the paper. In particular, the paper describes the application of statistical techniques, namely, various kinds of multivariate data analysis, to the problem of assessing the quality of a large-scale data collection system in the U. S. Navy. Results of using these techniques are described and indicate their usefulness as auditing procedures. While the discussion is placed in a particular context, the procedures should be of value for other large-scale information systems. (Author)
AD-704 890

COST-EFFECTIVENESS ANALYSIS FOR EDUCATIONAL PLANNING, Rand Corp Santa Monica Calif Margaret B. Carpenter, and Sue A. Haggart. Mar 70, 15p Rept no. P-4327

Descriptors: (*Education, Management planning),
(*Management planning, *Cost effectiveness),
Systems engineering, Performance (Human),
Problem solving, Money, Scheduling, Measure-
ment.
Identifiers: Program budgeting, Objectives.

Educational planning is ultimately concerned with achieving a more effective use of educational resources in improving pupil performance. There are several intermediate steps in the realization of this goal. Cost-effectiveness analysis is a tool that can assist the planner in relating the resources required by an educational program to its effectiveness, often measured by pupil achievement. (Author)
AD-704 778

MODELLING THE CONSUMPTION OF A FROZEN CONCENTRATED ORANGE JUICE: A CASE STUDY OF TIME SERIES ANALYSIS.

Technical rept.,
Wisconsin Univ Madison Dept of Statistics
George C. Tiao, and David J. Pack. Mar 70, 53p
Rept no. UWIS-DS-70-228
Grants DA-ARO (D)-31-124-G917, NSF-GP-6519
Report on Joint Business-Statistics Research Paper
Series No. 2.

Descriptors: (*Frozen foods, Consumption),
(*Commerce, *Time series analysis), Mathemati-
cal models, Correlation techniques, Analysis of
variance, Iterative methods, Numerical analysis,
Costs, Economics, Fruits, Beverages.
Identifiers: *Market research.

The study applies recently developed time series modelling techniques to a set of marketing data. Two models are presented, one relating the consumption of a frequently purchased consumer product to its past history, and the other describing the dynamic relationship between the consumption and the price of the product. It is found that the basic techniques require some elaboration for proper utilization with this marketing data. (Author)
AD-704 728

METHODOLOGY FOR ORGANIZING AND PROCESSING QUALITATIVE RELATIONSHIPS IN OPERATIONS RESEARCH.

Final rept.,
National Biomedical Research Foundation Silver
Spring Md

Robert S. Ledley, Marilyn Belson, Louis S. Rotolo, James B. Wilson, and Richard Bartelmebs. Feb 70, 123p Rept no. NBR-6806/4496
Contract Nonr-4496 (00)

Descriptors: (*Operations research, *Computer programs), Programming languages, Syntax, Computational linguistics, Computer logic, Problem solving.
Identifiers: Translator routines, *Automatic computer programming.

The purpose of the study was to develop a methodology for precisely handling qualitative information, which includes relations. Qualitative information usually involves relations described in terms of word statements, and the reason for handling such information is to develop an output or result which suggests a course of action. A methodology was developed for enabling the describing of qualitative relations in such a manner that they can be precisely handled and applied to particular situations, so that a precise course of action can be developed automatically. The processing of a given situation on a computer with respect to such a formulation would result in a prescription for action. By these means highly complicated and interrelated qualitative relations can be handled automatically by the computer. A set of so-called syntax definitions is written which embodies the ideas, concepts, and relations of the particular class of qualitative problems to be considered. These are the overall relations to be applied to any particular situation. The input, or 'situation,' string is a symbolization, usually in terms of ordinary words, of a particular circumstance that is to be analyzed. The input string, together with the syntax list, is used by a computer program called the 'transtaxor.' The report includes computer programs for the transtaxor as coded for the CDC-3600 and the IBM 360/44.
AD-704 171

SURVEY AND ANALYSIS OF MAJOR COMPUTING OPERATING SYSTEMS (OS SURVEY).
Final rept. Jul 69-Jan 70,
Comptre Corp Coral Cables Fla
Clinton S. McIntosh, Roger H. Evans, and Robert Lastra. 31 Jan 70, 278p* ESD-TR-70-65
Contract F19628-69-C-0291

Descriptors: (*Programming (Computers), Reviews), Classification, Specifications, Data processing systems, Time sharing, Scheduling.
Identifiers: *Operating systems (Computers), Multiprogramming, Third generation computers, Executive routines.

The major contemporary computer operating systems were surveyed and analyzed for the purpose of defining a functional classification structure applicable and common to the executive/control functions of all operating systems. In addition, performance parameters were developed for each of the common functions and the technical feasibility of various operating system validation techniques were assessed. While it was determined that an automated general purpose validation system is technically feasible, it is impractical at the present time. (Author)
AD-704 138

A UNIFIED APPROACH TO THE THEORY OF ACCOUNTING AND INFORMATION SYSTEMS.

Technical rept.,
Purdue Univ Lafayette Ind Krannert Graduate School of Industrial Administration
Claude S. Colantoni, Rene P. Manes, and Andrew Winston. 6 Mar 70, 41p*
Contract N00014-67-A-0226-0006

Descriptors: (*Management planning, Records), (*Data processing systems, Theory), Information retrieval, Programming (Computers), Information theory, Problem solving, Automation, Algebras, Armed Forces research.
Identifiers: Accounting, Management information systems, Accounting theory.

The paper is directed toward a unified solution to the modification of conventional accounting theory necessary to make it more compatible with present computer technology and to extend the system to include more diversified types of information and presents what we consider to be a new approach to the theory of accounting. The theory is based on an events approach to accounting and the concept of on-line direct access storage and retrieval. It takes the computer and its uses as an environmental fact, and bases the theory on the efficient utilization of this equipment to satisfy the informational needs of its users. It is an attempt to generalize the theory of accounting in a manner compatible with the increased demands placed on accountants by advances in the management and computer sciences. (Author)
AD-703 898

THE INCORPORATION OF BEHAVIORAL SCIENCES INTO MANAGEMENT CURRICULA AND RESEARCH (A STUDY OF CHANGE),
Texas Technological Coll Lubbock
V. P. Luchsinger. 23 Mar 70, 9p
Contract DAAD05-69-C-0102
Report on Project THEMIS. Presented at the Mountain-Plains Management Conference, Durango, Colo., 24 Oct 68.

Descriptors: (*Behavior, Scientific research), (*Management engineering, Programmed instruction), Correlation techniques, Teaching methods, Applied psychology, Effectiveness.
Identifiers: Themis project, Behavioral sciences.

The study is concerned with the behavioral sciences and their relationship to management curricula. Some question areas are: Are the subjects of interest to students and practitioners of the behavioral sciences in management; How are the behavioral sciences integrated into the curriculum; and Who provides the behavioral science instruction in management curricula. (Author)
AD-703 871

COST-EFFECTIVENESS: SOME TRENDS IN ANALYSIS,
Rand Corp Santa Monica Calif
E. S. Quade. Mar 70, 27p* Rept no. P-3529-1

Descriptors: (*Cost effectiveness, Analysis), Decision making, Economics, Problem solving, Programming (Computers), Mathematical models, Management planning, Behavior, Statistical analysis.
Identifiers: Systems analysis, Trends in analysis, Delphi technique.

Cost-effectiveness analysis is not a static craft; new approaches and techniques are being proposed constantly. Many of these are primarily computational in nature, but a few are directed toward a better treatment of those aspects of its problems that cannot be handled by purely quantitative methods. The emphasis in this paper will be on the latter. It will not attempt to be comprehensive but will merely note four trends involving, respectively: computers, mathematics, the use of expertise, and procedures to improve acceptance and implementation. (Author)
AD-703 387

THE DELPHI METHOD, IV: EFFECT OF PERCENTILE FEEDBACK AND FEED-IN OF RELE-

VANT FACTS,
Rand Corp Santa Monica Calif
N. Dalkey, B. Brown, and S. Cochran. Mar 70, 47p* Rept no. RM-6118-PR
Contract F44620-67-C-0045
See also Rept. no. RM-6115-PR. AD-698 735.

Descriptors: (*Decision making, Group dynamics), Feedback, Questionnaires, Test construction (Psychology), Iterative methods, Performance (Human).
Identifiers: Delphi method, Judgment.

Two variations in the form of feedback in Delphi exercises are investigated: the effect of feeding back the percentile location of an individual's answer in the group distribution and the effect of presenting the respondent with a single additional relevant fact. Experiments were set up to compare the improvement in responses to 20 general information type questions between two groups that received different feedback. (Author)
AD-702 790

DESIGN CONSIDERATIONS FOR A LARGE COMPUTING SYSTEM WITH A GEOGRAPHICALLY DISPERSED DEMAND.

Technical rept.,
Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
Richard Peebles. Mar 70, 34p* Rept no. 70-21
Contract N00014-67-A-0216-0007

Descriptors: (*Data processing systems, Design), Time sharing, Networks, Computers, Programming (Computers), Data transmission systems, Communication systems, Reliability, Management planning, Cost effectiveness.
Identifiers: Computer utility, Multiprogramming, *Multiaccess computer systems.

The report identifies the principal issues in choosing a design for a large data processing system with a geographically dispersed computing demand. Three approaches are described, centralization, decentralization, and distributed networks. (Author)
AD-702 759

INVENTORY MODELS WITH A TYPE OF DEPENDENT DEMAND AND FORECASTING, WITH AN APPLICATION TO REPAIR,
Center for Naval Analyses Arlington Va
George F. Brown, Jr., Timothy M. Corcoran, and Richmond M. Lloyd. 10 Feb 70, 9p Rept no. CNA-Professional Paper-20

Descriptors: (*Inventory analysis, Mathematical models), Lead time, Inventory control, Spare parts, Maintenance, Decision making, Probability density functions, Mathematical prediction, Costs.

In general, the single-product inventory model in which demands in successive periods are not independent is difficult to treat. The paper defines a large class of such problems, when there is a positive lead time for delivery, which can be treated by the classical formulation with a single state variable. All results which hold for inventory models with a constant delivery lag can be shown to hold also for the model. An application is made to a system in which demands are generated by part failure and in which a portion of these failures are repaired after a given (constant or probabilistic) time. (Author)
AD-702 456

INVENTORY AND THE THEORY OF THE FIRM,

Center for Naval Analyses Arlington Va
Marshall Rose. 18 Feb 70, 16p Rept no. CNA*Professional Paper-18

Descriptors: (*Inventory analysis, Mathematical models), Inventory control, Management planning, Cost effectiveness, Decision making, Spare parts, Maintenance, Economics, Optimization.

A serious criticism of the inventory models presented in the literature is that they often seek to minimize inventory costs rather than to minimize total costs for a specified production level. This neglect is caused, in large measure, by a failure to consider inventories as factors of production, with substitution possibilities between other types of inputs. The paper incorporates these substitution possibilities into the analysis, and formulates an inventory model within the theory of the firm. (Author)
AD-702 454

AN INCREMENTAL PRODUCTION FUNCTION FOR THE END-ITEM REPAIR PROCESS,
Center for Naval Analyses Arlington Va
Marshall Rose, and Lee Brown. 3 Mar 70, 22p Rept no. CNA-Professional Paper-17

Descriptors: (*Inventory control, Optimization), Maintenance, Operational readiness, Cost effectiveness, Time studies, Spare parts, Stock level control, Procurement, Replacement theory, Decision making, Mathematical models, Naval aircraft.
Identifiers: *Maintenance management, Resource allocation.

The article discusses the case of a firm that owns a fleet of end items and a repair facility for conducting periodic scheduled maintenance of the end items. If the number of units of operational end items is less than required, the firm can correct the deficiency by taking several courses of action. The optimal set of actions to be taken by the firm under various assumptions is determined. A numerical example is solved using both mathematical and graphical methods. (Author)
AD-702 453

STUDY OF REPARABLE ITEM RESUPPLY ACTIVITIES,
Center for Naval Analyses Arlington Va
Marshall Rose. 18 Feb 70, 38p Rept no. CNA-Professional Paper-16

Descriptors: (*Aircraft, Maintenance), (*Spare parts, Stock level control), (*Stock level control, Effectiveness), Time studies, Maintainability, Supply depots, Queueing theory, Probability density functions, Stochastic processes, Mathematical models, Optimization.
Identifiers: Maintenance management.

The paper is concerned with calculating the significant measures of supply effectiveness for activities which involve the resupply of reparable items (spares). The approach that is taken is to derive an expression for the number of unsatisfied demands existing for the items at a point in time. This expression can then be employed to calculate the desired measures of supply effectiveness which describe the behavior of the model. Several numerical examples illustrating the model's use are presented in the concluding part of the paper. (Author)
AD-702 452

COMPUTING THE EXPECTED END-PRODUCT SERVICE TIME USING EXTREME VALUE PROPERTIES OF SAMPLING DISTRIBUTIONS.
Center for Naval Analyses Arlington Va
Marshall Rose. 18 Feb 70, 32p Rept no. CNA-Professional Paper-15

Descriptors: (*Time studies, Maintenance), Maintainability, Probability density functions, Stochastic processes, Mathematical models.
Identifiers: *Maintenance management.

In the paper an expression is derived for the expected completion time of a repair project, such as the servicing of end products, when the servicing is composed of a sequence of repair activities on parts of the end product. Each part of the end product is subject to repair with a specified probability and, at first, it is assumed that the completion time of each activity is constant. Subsequently, this assumption is relaxed so that an arbitrary probability distribution can be specified for the repair time of each activity. The concluding parts of the paper show how to compute the expected service time for a particular class of repair activity-time probability distributions. (Author)
AD-702 451

DETERMINATION OF THE OPTIMAL INVESTMENT IN END PRODUCTS AND REPAIR RESOURCES,
Center for Naval Analyses Arlington Va
Marshall Rose. 18 Feb 70, 40p Rept no. CNA-Professional Paper-14

Descriptors: (*Naval aircraft, Inventory control), (*Inventory control, Cost effectiveness), Naval procurement, Maintenance, Operational readiness, Jet fighters, Spare parts, Replacement theory, Maintenance equipment, Maintenance personnel, Time studies, Decision making, Optimization, Mathematical programming.
Identifiers: *Constrained minimization, F-4 aircraft, *Logistics management.

The paper demonstrates how to determine the minimal cost combination of end products and investment in repair service capability in order to maintain a given level of operating end products. The model is then applied to the problem of determining the optimal size of the Navy's F-4 aircraft pipeline. (Author)
AD-702 450

AN INTRODUCTION TO EQUIPMENT COST ESTIMATING,
Rand Corp Santa Monica Calif
C. A. Batchelder, H. E. Boren, Jr., H. G. Campbell, J. A. Dei Rossi, and J. P. Large. Dec 69, 134p Rept no. RM-6103-SA
Contract DAHC15-67-C-0150

Descriptors: (*Armed Forces procurement, Costs), (*Costs, Mathematical prediction), Armed Forces supplies, Statistical data, Regression analysis, Learning curves, Least squares method, Multivariate analysis, Correlation techniques, Manufacturing methods, Industrial production, Manpower studies, Systems engineering.
Identifiers: *Cost estimates, Data acquisition, Curvilinear regression, Management information systems, Cost analysis.

There are three basic methods used for cost estimation--the industrial engineering, analogy, and statistical approaches. The statistical method is considered the most useful for government cost analysts, whether the purpose is long-range planning or contract negotiation. An estimating procedure must rely on a data base that includes cost, physical and performance descriptions, and a development and production history of previous equipment programs. Experience has proved the value of the learning-curve concept. Its basis is that each time the total quantity of items produced doubles, the cost per item is reduced to a constant percentage of its previous cost. A thorough knowledge of the learning-curve phenomenon is indispensable to persons involved in cost analysis. (Author)
AD-702 424

CAPITAL INVESTMENT MODEL.

Final rept.
Litton Systems Inc Monterey Calif Mellonics

Systems Development Div

2 Jan 70, 66p NAVSPERS-PRD-PRR-70-6
Contract N00022-69-C-0100

Descriptors: (*Manpower, *Naval aviation), (*Budgets, Naval training), (*Pilots, Military requirements), Mathematical models, Management engineering, Linear programming, Cost effectiveness, Factor analysis, Job analysis, Programming (Computers).
Identifiers: *Capital investment models, Constraints, Process analysis.

A capital investment model (CIM) was developed to afford Navy management with a tool for improved budget planning. The model provides the quantitative means of examining manpower and equipment requirements for NAS Saufley and associated squadrons to support specified pilot training rates. Process analysis was used to examine the work flow of the organizations, and it provides the mathematical structure for the model in terms of labor and equipment inputs, intermediate products, and final outputs (trained pilots). This structure combined with linear programming techniques, is used to determine the optimum (least cost) manpower and equipment requirements for a particular pilot training rate. The effects, in terms of manpower and equipment costs, of policy constraints imposed on the number or use of particular labor skill categories and equipment types can also be analyzed. (Author)
AD-701 302

COMPUTING EXPECTED VALUES OF CUSTOMER REQUESTS BACKORDERED.
Technical rept.

Army Logistics Management Center Fort Lee Va
Alan J. Kaplan. Feb 70, 11p*

Descriptors: (*Army procurement, Mathematical prediction), (*Inventory control, Management planning), Statistical processes, Problem solving, Costs, Probability, Factor analysis, Time, Data processing systems.
Identifiers: Backordering, Orders (Commitments), Stockout costs.

The document considers the stockout cost for an inventory manager as a function of the number of customer requests backordered, each request possibly being for several units of stock. The problem arises of computing the expected stockout cost in terms of requests, when techniques are available for computing it in units. A simple conversion factor is desirable. Based on a formal analysis, the conversion factor $1/E(X)$ is recommended where $E(X)$ is average size of a customer request. (Author)
AD-701 172

PROJECT ABLE APPLIED TO AIRCRAFT ENGINE DEVELOPMENT AND PROCUREMENT.
Operations analysis rept.,
Air Force Logistics Command Wright-Patterson AFB Ohio Operations Analysis Office
Raymond E. Cavender. Jan 70, 56p Rept no. OAR-8-Suppl-1

Descriptors: (*Air Force procurement, *Management engineering), (*Aircraft engines, Logistics), Decision making, Contracts, Costs, Mathematical models, Inventory, Instruction manuals.
Identifiers: Logistics management, ABLE (Acquisition Based on Consideration of Logistic Effects), Acquisition based on consideration of logistic effects.

The paper adapts the general methodology of project ABLE to the specific situation of aircraft engine development and procurement. By this method, a measurement tool for use in tradeoff decisions is provided, along with a contractual

structure to assure the use of this tool. The underlying concept is that all the consequences of decisions should be measured, to the extent practicable, and be the basis of each decision. All the cost categories considered in the original ABLE paper are used, along with two new categories. (Author)
AD-700 986

COMPUTERIZED FACILITIES DESIGN-AN EVALUATION.

Technical rept.,
Florida Univ Gainesville Dept of Industrial and Systems Engineering
Stephen D. Roberts. Nov 69, 24p* Rept no.
THEMIS-UF-TR-30 AROD-T-1:46-RT
Contract DAH04-68-C-0002

Descriptors: (*Management planning, Industrial plants), (*Industrial plants, Design), Programming (Computers), Systems engineering, Flow charting, Material control, Production control, Industrial equipment, Handling, Cost effectiveness.
Identifiers: *Plant layout, Computer aided design, CRAFT computer program, CORRELAP computer program, ALDEP computer program, Themis project.

The computer is just beginning to have an impact in the area of facilities planning. Recently several computer programs have been developed for facilities design. These programs are compared in their usage and an attempt has been made to objectively evaluate each. Both the desirable and undesirable features of the approaches are discussed and some indications as to possible future developments are provided. (Author)
AD-700 119

SYSTEMS MANAGEMENT APPLIED TO LARGE COMPUTER PROGRAMS IN BUIC III: REVIEW OF EXPERIENCE.

Rept. for Jul 68-Jun 69,
System Development Corp Santa Monica Calif
Lloyd V. Scarle, Perry E. Rosove, and Eugene H. Sydow. Jun 69, 129p ESD-TR-69-302
Contract F19628-67-C-0026
Revision of Rept. no. SDC-TM-4223 dated 25 Feb 69.

Descriptors: (*Antiaircraft defense systems, Command+ control systems), (*Command+ control systems, Programming (Computers)), (*Air Force procurement, *Management engineering), Data processing systems, Specifications, Air defense command.
Identifiers: BUIC 3 (Back-Up Interceptor Control 3), Back-up interceptor control 3, SAGE.

The report is a review and analysis of experience with the application of Air Force systems management techniques to the acquisition of information processing elements in the 416M (BUIC III) system program. The report includes a background review of the systems management concepts and trends in relation to practices which had been employed in L-system programs preceding BUIC III. Novel requirements introduced in BUIC III are identified in the areas of computer program configuration management, standard documentation, design reviews, and Category I testing, and a summary is presented of the milestones associated with these requirements as they actually occurred during the program. Finally, the experience in specific areas is discussed and evaluated with respect to implications for future modification and use of the management techniques. (Author)
AD-699 585

THE USE OF PPBS IN A PUBLIC SYSTEM OF HIGHER EDUCATION: IS IT 'COST-EFFECTIVE,'

Rand Corp Santa Monica Calif
James S. Dyer. Dec 69, 20p* Rept no. P-4273

Descriptors: (*Universities, Management planning), (*Management planning, *Cost effectiveness), Budgets, Education, Decision making, Organizations, Operations research, Students, Learning, Research program administration, Substitutes, Sociology, Economics.
Identifiers: Systems analysis, Project management, Public services, Evaluation.

The paper consists of a qualitative discussion of the potential benefits to be derived from the use of Planning-Programming-Budgeting Systems (PPBS) in public higher education. The discussion is divided into three primary sections. The first section briefly describes the existing classical techniques of planning and budgeting for public systems of higher education. The limitations inherent in these approaches are considered. The second section presents suggestions for the application of PPBS to public higher education systems. The problems of identifying the objectives of higher education, of developing satisfactory measures of effectiveness for evaluating the attainment of these objectives, and of structuring a program budgeting format that will assist decisionmaking with regard to resource allocation are described. The third section is concerned with the effect of PPBS on the relationships between the organizational units of the system, with particular emphasis being placed on questions of authority and power redistribution. (Author)
AD-699 557

LIFE CYCLE COSTING IN SYSTEM ACQUISITION.

Logistics Management Inst Washington D C

Nov 69, 47p Rept no. LMI-69-10
Contract SD-271

Descriptors: (*Department of Defense, Logistics), (*Armed forces procurement, Cost effectiveness), Armed Forces supplies, Maintenance, Life expectancy, Manpower studies, Costs, Decision making, Management planning, Predictions.
Identifiers: *Life cycle costing, Logistics management.

Life cycle costing is defined as the process of estimating all those costs--development, production, operation, and support--which can influence the choice among competing design concepts or specifications, among possible procurement procedures, or among competing proposals for production in the acquisition of major defense hardware systems. After discussion of its objectives and characteristics, life cycle costing is separated into three methods: the implicit method; the cost estimating relationship method; and the element estimate method. The appropriateness of each method is discussed (a) for different stages of the system life cycle, (b) for 'incremental improvement' systems and 'new generation' systems, and (c) for overall system investment, overall operation and support cost, major subsystem investment, and selected operation and support cost elements. The roles of element structures, cost factors, and costing rules in Life Cycle Cost analysis are outlined.
AD-699 191

THE QUANTITY VERSUS THE QUALITY OF THE DATA USED IN THE DERIVATION OF A COST ESTIMATING RELATIONSHIP.

Research paper,
Institute for Defense Analyses Arlington Va Cost Analysis Group
Morris Zusman. Sep 69, 35p Rept no. RP-P-481
IDA/HQ-69-10701

Presented at the Joint National Meeting of the Operations Research Society of America and the American Astronautical Society, Denver, Colo., 18 Jun 69.

Descriptors: (*Costs, Mathematical prediction), Confidence limits, Mathematical models, Distribution functions, Uncertainty, Regression analysis, Analysis of variance.
Identifiers: *Cost estimates.

Trade-offs on how a cost analyst might best allocate his time between collecting data on additional programs and analyzing in further detail the data already in his possession are presented. The measure of the cost analyst's productivity is the reduction in the confidence bandwidth about the cost estimate.
AD-699 131

REPORT OF SIMULATION OF VARIOUS DEMAND FORECASTING TECHNIQUES.

Defense Supply Agency Alexandria Va
Jun 68, 57p*

Descriptors: (*Inventory control, Management planning), (*Management planning, Predictions), Computer programs, Inventory analysis, Statistical analysis, Accuracy, Effectiveness.
Identifiers: Data smoothing, Double exponential data smoothing, SAMMS (Standard Automated Material Management System) Standard automated material management system, Computerized simulation.

Management of an inventory the magnitude of that of the Defense Supply Agency makes mandatory the forecast of requirements by computer to the maximum extent possible. Computerized calculations are feasible when standard or uniform procedures are used. The Standard Automated Materiel Management System prescribes use of double exponential smoothing as the technique for forecast of future demands. The study compares the prescribed technique with other prevalent methods and presents the results of penetrating tests.

AD-698 831

THE DELPHI METHOD, III: USE OF SELF-RATINGS TO IMPROVE GROUP ESTIMATES,

Rand Corp Santa Monica Calif
N. Dalkey, B. Brown, and S. Cochran. Nov 69, 28p* Rept no. RM-6115-PR
Contract F44620-67-C-0045
See also Rept. no. RM-5957-PR, dated Jun 69, AD-690 988.

Descriptors: (*Decision making, Group dynamics), Questionnaires, Test construction (Psychology), Students, Psychometrics, Reaction (Psychology), Statistical analysis.
Identifiers: Self appraisals, Delphi method, Evaluation, Judgment.

An analysis is given of the validity of using self-ratings as a technique for selecting more accurate subgroups in applications of the Delphi procedures for eliciting group judgments. A series of experiments was conducted using groups of upper-class and graduate college students answering almanac-type questions. (Author)
AD-698 735

TIME-SHARING INNOVATION FOR OPERATIONS RESEARCH AND DECISION-MAKING,

Washington Operations Research Council
Hugh V. O'Neil, and Donald W. King. 1969, 267p*
Proceedings of Operations Research/Time-Sharing Symposium, National Bureau of Standards, Gaithersburg, Md., 29-31 Oct 68.
Availability: Paper copy available from the Washington Operations Research Council, Potomac, Md. 20854. \$10.00.

Descriptors: (*Operations research, *Time shar-

ing), (*Management engineering, Time sharing), Decision making, Management planning, Data processing systems, Systems engineering, Cost effectiveness, Problem solving, Models (Simulations), Symposia.

Identifiers: *Management information systems, *Computer aided analysis, On line computers.

The theme of the book is computer time-sharing innovation and operations research with particular emphasis placed on exploring the role of time-sharing technology as a tool for decision-making. Particular hardware and software techniques are not emphasized, although current applications are presented in some of the papers. The book is meant for management and systems analysts who wish to investigate the benefits of time-sharing capabilities. AD-698 428

DEVELOPING A PROGRAM BUDGETING SYSTEM AS AN AID IN PLANNING HIGHER EDUCATION,

Rand Corp Santa Monica Calif

S. A. Haggart. Nov 69, 14p Rept no. P-4252

Descriptors: (*Education, Management engineering), Systems engineering, Budgets, Scheduling, Costs, Models (Simulations), Control systems, Organizations.

Identifiers: *Program budgeting, Higher education.

Program budgeting has been discussed by proponents and opponents to such a great degree that many of its basic characteristics, or features, have been obscured. This is partly due to the fact that program budgeting means quite different things to different people. A list of features discussed provides a means of picturing these different ideas; the features of program budgeting are rather loosely ranked from the more simple to the more complex. (Author)
AD-698 143

IDEAS FOR MANAGERS: A DIGEST OF ACTIONS FOR INCREASING EFFICIENCY AND ECONOMY IN THE MANAGEMENT OF DEFENSE ACTIVITIES.

Assistant Secretary of Defense (Installations and Logistics) Washington D C

1969, 168P*

*Availability: Paper copy available from Superintendent of Documents, GPO, Washington, D. C., 20402.

Descriptors: (*National defense, Effectiveness), (*Management engineering, Handbooks), (*Costs, Reduction), Budgets, Maintenance, Documentation, Value engineering, Optimization, Materials, Procurement, Data processing systems, Communication systems, Transportation, Housing, Packaging.

Identifiers: Cost reduction.

Cost cutting insights that reap small rewards at one locale or in a relatively minor function could conceivably save substantial sums when extended to other locales and functions. This pamphlet, which organizes a thousand cost-saving ideas with relevant bibliographies for wide distribution throughout the Department of Defense, serves as a starting point in the procedure by showing how existing management data can be cataloged and disseminated. (Author)
AD-697 990

ADVANCED MATERIEL SYSTEMS PLANNING.

Technical memo.,

Case Inst of Tech Cleveland Ohio Operations Research Group
Burton V. Dean, and Lawrence E. Hauser. 15 Sep

66, 85p Rept no. TM-65
Contract Nonr-1141 (19)

Descriptors: (*Management engineering, Mathematical models), (*Decision theory, Systems engineering), Dynamic programming, Cost effectiveness, Computer programs, Data processing systems, Optimization, Budgets, Probability, Problem solving, Army operations.

Identifiers: Research and development, Materiel systems, Alternatives.

The report is concerned with the development of mathematical models, computer programs, and data requirements to conduct development systems planning in large R and D organizations. (Author)
AD-697 971

A NEW MANAGEMENT TOOL: CRITICAL PATH CHARTING APPLIED TO GRAPHICAL DISPLAY.

Dartmouth Coll Hanover N H Dept of Mathematics
John L. Anderson, and Miles V. Hayes. 2 Jun 69,
89p AFOSR-69-2988TR
Contract F44620-68-C-0015

Report on Project Themis.

Descriptors: (*Management planning, Flow charting), (*Programming (Computers), Graphics), Cathode ray tubes, Cost effectiveness, Labor, Materials, Time, Punched tape, Digital computers, Data storage systems, Command+ control systems, Networks, Reading machines.

Identifiers: *PERT, *Critical path method.

The report describes how the PDP-9/graphics system can be used in management for project evaluation and review technique (PERT). The background for PERT and critical path charting and a description of the graphics system are included. A sample problem demonstrates the value of graphics in management functions. (Author)
AD-697 805

PRODUCT OR SYSTEMS RESEARCH AS APPLIED TO EDUCATION FOR BUSINESS,

Human Resources Research Organization Alexandria, Va
Felix F. Kopstein. Oct 69, 25p Rept no. HUMRRO professional paper-30-69

*Availability: Pub. in National Business Education Quarterly, v37 n3 p19-26 Mar 69.

Descriptors: (*Education, *Commerce), (*Programmed instruction, Analysis), Models (Simulations), Operations research, Feedback, Effectiveness, Human engineering.

Identifiers: Business education, Instructional systems, Instruction models.

The document is directed toward a definition of system as applied to research in business education. AD-697 541

QUANTITATIVE TECHNIQUES FOR RESEARCH PROGRAM PLANNING IN STRUCTURAL MECHANICS.

Final rept. Jan-Sep 69.

National Materials Advisory Board (Nas-Nae)
Washington D C

Aug 69, 72p Rept no. NMAB-259
Contract N00014-67-A-0244

Descriptors: (*Structures, *Research program administration), Management planning, Mechanics, Matrix algebra, Marine engineering.

The Committee has concluded that systematic procedures to assess the relative importance of various subdisciplines in structural mechanics have promise as methods for providing guidance in op-

timizing the allocation of resources for research program formulation. Inasmuch as such procedures are not helpful in anticipating scientific breakthroughs, 25% of the overall research budget should be allocated exclusively, on the discretionary judgment of the Branch staffs members, to fundamental research which has broad promise of application to Naval missions. The matrix method is considered as the most promising planning technique. (Author)
AD-696 974

COMMUNICATION MEDIA: PROPERTIES AND USES.

Rand Corp Santa Monica Calif

Rudy Bretz. Sep 69, 128p* Rept no. RM-6070-

NLM/PR

Contracts F44620-67-C-0045, NLM-69-10

Descriptors: (*Education, *Communication systems), (*Training devices, Communication systems), Teaching methods, Teaching machines, Data transmission systems, Computers.

Identifiers: Visual aids.

The memorandum defines and describes communication media; discusses the difference between information and instruction, instructional media and instructional aids; and proposes a set of criteria by means of which communication media may be distinguished from nonmedia, one medium distinguished from another, and discrete media distinguished from multimedia applications. A two-dimensional classification system for communication media is proposed: In one dimension, seven classes are defined, based on ways of representing information; in the other, communication media are divided into two groups, telemedia and recording media. Twenty-eight specific communication media are defined and described. This list includes the major available and soon-to-be-available media. (Author)
AD-696 956

THE IMPLICATIONS OF ADP NETWORKING STANDARDS FOR OPERATIONS RESEARCH,

Mitre Corp Bedford Mass

Paul L. Peck. Jun 69, 21p Rept no. MTP-333

Contract F19628-68-C-0365

Descriptors: (*Operations research, Data processing systems), (*Data processing systems, Standardization), Time sharing, Computers, Programming (Computers), Efficiency, Standards.

The report discusses the aspects of data processing which have hindered the integration of operations research capabilities in large decentralized organizations. Networking is proposed as a means of promoting OR integration, the factors which have inhibited successful networking are discussed, and ADP standardization is suggested as a means of overcoming existing limitations. (Author)
AD-696 675

A MODEL OF A SYSTEMS ANALYSIS STUDY.

Research rept.,

Naval Postgraduate School Monterey Calif

Carl R. Jones. 10 Jul 69, 41p Rept no. NPS-55js/9017A

Descriptors: (*Management planning, Decision theory), (*Cost effectiveness, Decision making), Mathematical models, Government procurement, Economics, Problem solving, Partial differential equations, Matrix algebra, Optimization, Operations research, Budgets, Curve fitting.

Identifiers: *Management information systems, Systems analysis, Alternatives, Benefit cost analysis.

The paper is concerned with a governmental decision-maker who chooses among alternatives whose costs and benefits have been illuminated analytically. The decision-maker is considered to be involved in a planning, programming and budgeting system and to be responsible for at least some area where cost-benefit studies can be helpful. The decision maker's study team is envisaged as being given an assignment to develop the alternatives and their costs and benefits. The output of the study team is some representation of a cost-benefit surface. (Author)

AD-695 427

THE FINANCIAL PORTION OF A MANAGEMENT INFORMATION SYSTEM,
Rand Corp., Santa Monica, Calif.
F. S. Pardee. Dec 61, 45p RM-2836-PR
Contract AF 49 (638)-700
Distribution Limitation now Removed.

Descriptors: (*Weapon systems, Costs), (*Management engineering, *Budgets).
Identifiers: Scheduling, Programming (Computers), Graphic representation, *Management information systems.

The memorandum suggests that an operational financial system should include: A capability to prepare and present summary force structure costs showing cradle-to-grave implications by research and development. Investment, and operation for alternative major mission or overall force mixes. A series of cost sensitivity curves is given on each major weapon system showing the financial implications of alternative design and operational concept characteristics and financial studies of alternative con-system programs, particularly in the basic and applied research areas. (Author)

AD-413 607

M5 PERSONNEL MANAGEMENT

RATIONAL VS. EMPIRICAL APPROACHES TO JOB/TASK DESCRIPTIONS FOR COBOL PROGRAMMERS,
Human Resources Research Organization Alexandria Va
Felix F. Kopstein. Jun 70, 16p Rept no. HUMRRO professional paper-18-70
Contract DAH19-70-C-0012

Presented at the Annual Conference of the Special Interest Group, Computer Personnel Research of the Association for Computing Machinery (7th), Chicago Univ., Ill., Jun 69.

Descriptors: (*Programmers, Training), (*Programming (Computers), Job analysis), Instruction manuals, Army personnel, Programming languages.
Identifiers: COBOL.

The purpose of the paper is to contrast empirical approaches deriving from job analysis and rational approaches deriving from task/equipment analysis, and to suggest the differences in the information to be gained from each. Job analysis establishes what exactly a representative sample of incumbents do on the job. Task/equipment analysis deduces the behavioral requirements for its operators and maintainers from the functional characteristics of equipment, or from task situations that do not yet exist in actuality. The purely empirical approach develops a set of behavioral capabilities together with associated frequencies of occurrence, but cannot guarantee that the required set of behavioral capabilities will be exhaustively enumerated. The purely rational ap-

proach will develop an exhaustive set of behavioral capabilities requisite for certain job or task constellations, but will provide no good way of establishing their probabilities of occurrence. Therefore, a combined approach seems desirable. It is illustrated in the context of a COBOL programmer's job. The use of data from combined rational and empirical job/task analyses for statistical models of job families is discussed. The uses of these models in training design is also discussed.

AD-713 716

A MANPOWER DELIVERY SYSTEM: IMPLICATIONS FOR CURRICULUM DEVELOPMENT,
Human Resources Research Organization Alexandria Va

Robert G. Smith, Jr. Jun 70, 11p* Rept no.

HUMRRO professional paper-19-70

Presented at the Invitation Conference on Curriculum Development and Vocational Education, Minneapolis, Minnesota, Mar 70.

Descriptors: (*Manpower, Industrial relations), (*Personnel management, Mathematical models), Abundance, Industrial training, Job analysis, Systems engineering, Programmed instruction, Management planning, Factor analysis, Data processing systems.
Identifiers: Vocational guidance.

A simplified and abstract model of a manpower delivery system is presented. The relationships among the functions of occupational demands, guidance activities, placement work, occupational barriers, and interests of the job-seeker are discussed. The model points out to educational and training planners the principal aspects to consider when conducting a system analysis for vocational or professional education. (Author)

AD-713 499

HOW TO SUCCEED IN BUSINESS ACCORDING TO AIESEC APPLICANTS FROM SIX COUNTRIES FOR WORK EXPERIENCE ABROAD.

Technical rept.,
Rochester Univ N Y Management Research Center

Edward C. Ryterband, Bernard M. Bass, Samuel D. Deep, and Rene Kaye. 1 Jul 70, 24p Rept no.

TR-39

Contract N00014-67-A-0398-0002

Prepared in cooperation with European Research Group on Management, Louvain (Belgium).

Descriptors: (*Commerce, Performance (Human)), (*Management engineering, Effectiveness), Students, Questionnaires, Employment, Culture, Social psychology, Attitudes, Analysis of variance, Industrial relations, Western Europe, United States.

Identifiers: Crossculture (Sociology), Comparison, *Business success, Management information systems.

Students seeking employment outside their own countries from the Netherlands, Sweden, West Germany, the United States, the United Kingdom and France completed an organization success questionnaire. In all countries, on the whole, social were favored over political approaches. Clusters of countries could be identified according to the order in which their nationals endorsed social and political approaches. (Author)

AD-712 483

COMBATING OBSOLESCENCE USING PERCEIVED DISCREPANCIES IN JOB EXPECTATIONS OF RESEARCH MANAGERS AND SCIENTISTS: A PRELIMINARY REPORT.

Technical rept.,
Rochester Univ N Y Management Research Center

Gerald V. Barrett, Bernard M. Bass, and John A.

Miller. 1 Jul 70, 30p Rept no. TR-37

Contract N00014-67-A-0398-0006

Presented at the Symposium on Combating Professional Obsolescence, Churchill Coll., Cambridge Univ. (England), 22-26 Jun 70.

Descriptors: (*Professional personnel, Obsolescence theory), (*Job analysis, Predictions), (*Automation, Impact), Attitudes, Questionnaires, Computers, Scientific personnel, Retraining, Statistical data, Manpower studies.
Identifiers: Job expectations, Technological change, Research managers, Self development.

R and D scientists, engineers and managers completed a questionnaire Exercise Future as part of an experiment to test effects on subsequent self-development activities. Three-fourths see and want educational upgrading but only 44 per cent expect to have time allocated for their own development. Positive attitudes were seen toward the expected increasing impact of computers on R and D but the expected reward structure was perceived to be consistent with needs for development to avoid obsolescence. Freedom from organizational constraints was important to most respondents but few expected to achieve such freedom to select new projects or set schedules for themselves. Similarly, although the organization's rules were important to most, few expected to exert any influence on them. (Author)

AD-712 482

COMPARATIVE SURVEYS OF MANAGERIAL ATTITUDES AND BEHAVIOR.

Technical rept.,
Rochester Univ N Y Management Research Center

Gerald V. Barrett, and Bernard M. Bass. 1 Aug 70,

55p* Rept no. TR-36

Contract N00014-67-A-0398-0002

Presented at the Comparative Management Workshop held at New York City on 30-31 May 70.

Descriptors: (*Management engineering, Psychometrics), (*Behavior, Reviews), Employee relations, Interactions, Motivation, Decision making, Uncertainty, Attitudes, Environment, Northern hemisphere, Southern hemisphere.
Identifiers: *Managerial personnel, *Cross national research, Supervisor subordinate relations.

A review of cross-national managerial attitudes and behaviors was organized around eight themes. The eight subject areas were: superior-subordinate relationships; managerial needs or motivation; interpersonal processes; organizational goals; perceptions of equity; decision-making under uncertainty; managerial values; relationship between managerial attitudes and other organizational and environmental variables. It was concluded that while the comparative study of managerial behavior is extremely difficult because the usual research problems are magnified many times. Despite methodological problems, considerable advances have been made in a relatively short time. Several substantive research directions were proposed. (Author)

AD-712 481

EMPATHY, PROJECTION AND NEGATION IN SEVEN COUNTRIES.

Technical rept.,
Rochester Univ N Y Management Research Center

Ralph A. Alexander, Gerald V. Barrett, Bernard M. Bass, and Edward C. Ryterband. 1 Aug 70, 50p

Rept no. TR-35

Contract N00014-67-A-0398-0002

Corrects and supersedes Technical report 35 dated 1 May 70, AD-708 055.

Descriptors: (*Culture, *Attitudes), Interactions, Reviews, Questionnaires, Analysis of variance, Statistical processes, Leadership, United States, Great Britain, India, Norway, Spain, Denmark, Italy, Personnel management, Psychometrics.
Identifiers: Comparison, Empathy, *Management attitudes, Projection (Psychology), Crossculture (Sociology), Negation.

Data were collected on 451 middle managers from seven countries (United States, India, Norway, United Kingdom, Spain, Denmark, and Italy), who had participated in exercise life goals during management development workshops in their home countries. The managers placed 11 goals such as wealth, leadership, prestige, etc., in rank order of importance for themselves and for each of the other members of their own study group. Correlational measures of association were calculated for each manager on empathy, projection and negation. Comparisons were then made between managers from the various countries on these three areas of interpersonal perception. (Author)
AD-712 480

ETHNIC GROUP MEMBERSHIP AS A MODERATOR OF JOB PERFORMANCE.

Technical rept.,

American Institutes for Research Pittsburgh Pa
Brian S. O'Leary, James L. Farr, and Claude J. Bartlett. Apr 70, 165p Rept no. AIR-753-4/70-TR-1
Contract N00014-68-C-0341

Descriptors: (*Performance (Human), Job analysis), (*Culture, Impact), (*Group dynamics, Test methods), Test construction (Psychology), Reliability, Standards, Personnel management, Analysis of variance, Statistical processes.
Identifiers: Ethnic groups, Test bias.

The report presents some findings in a research project to investigate problems of subcultural differences in the prediction of job performance. Phase I of the project was an attempt to obtain an adequate picture of the effects of cultural factors on existing selection procedures. Seven independent studies were conducted in which the validity of commercial and industrially developed selection tests was examined separately for white and Negro subgroups of the population using the eleven different relationships. Occupational groups which were studied included toll collectors, correctional officers, toll facility officers, various clerical workers, and keypunch operators. A sample of inmates in a federal correctional institution was also studied. (Author)
AD-711 981

AN EXPERIMENTAL PROGRAM OF INSTRUCTION ON THE MANAGEMENT OF TRAINING.

Technical rept.,

Human Resources Research Organization Alexandria Va

Donald F. Haggard, Norman Willard, Jr., Robert A. Baker, William C. Osborn, and Shepherd Schwartz. Jun 70, 343p Rept no. HUMRRO-TR-70-9

Contract DAHC19-70-C-0012

Descriptors: (*Teaching methods, Military training), (*Military training, *Management engineering), Job analysis, Military personnel, Personnel management.
Identifiers: Training management, Course instruction, Evaluation.

A 96-hour course on the management of training was developed and evaluated for presentation to Advanced Officer classes. The general procedures followed in developing the course were: construction based on job task statements, a systems engineering approach to training, and state-of-the-art technology; repeated presentation of course materials, and modification by training research personnel on the basis of student and instructor appraisals. The course was then presented and evaluated by a military instructor. (Author)
AD-711 948

TASK ANALYSIS REDUCTION TECHNIQUE (TART) FOR THE QUANTIFICATION OF HUMAN PERFORMANCE.

Research memo.,

Naval Personnel and Training Research Lab San Diego Calif

Robert H. Ellis. Sep 70, 38p Rept no. SRM-71-7

Descriptors: (*Man-machine systems, Antisubmarine warfare), (*Performance (Human), Statistical analysis), Human engineering, Factor analysis, Tactical air support, Data processing systems, Performance tests, Simulation, Naval research, Personnel management.
Identifiers: Antisubmarine warfare tactical data system, TART (Task Analysis Reduction Technique), Task analysis reduction technique.

A Task Analysis Reduction Technique (TART) for collecting human factors information was developed and applied to the anti-submarine warfare tactical data system. TART is a specific procedure for analyzing the man/machine interface which allows the researcher to analyze sequential properties of the man/machine interaction. The technique is based on an analysis of the interface at a task level and uses closed circuit television and video tape recording apparatus. A trial application was performed using four air detector/tracker who were presented a one-hour air scenario in the anti-submarine warfare tactical data system. The results section presents various breakdowns of the TART data and indicate that TART can provide valuable insight into man/machine design and training effectiveness decisions. (Author)
AD-711 807

POLICY SCIENCES AND POLICY RESEARCH ORGANIZATIONS.

Rand Corp Santa Monica Calif

Charles Wolf, Jr. Sep 70, 11p Rept no. P-4457

Descriptors: (*Decision making, *Training), (*Research program administration, Organizations), Education.
Identifiers: *Policy analysis, Policy research organizations.

Consideration is given to the question whether policy research organizations, or a subset of them, have a potentially important role in contributing to the supply of policy analysts, through advanced teaching and training programs.
AD-711 746

PERSONAL VALUES AND MILITARY ADMINISTRATION.

Technical rept.,

Minnesota Univ Minneapolis Dept of Psychology
George W. England, Naresh C. Agarwal, Robert E. Terise, Richard R. Cottrell, and Karen A. Olsen. Aug 70, 92p

Contract N00014-68-A-0141-0003

Descriptors: (*Naval personnel, Attitudes), (*Officer personnel, Questionnaires), (*Test construc-

tion (Psychology), Personnel management), Management planning, Naval research, Psychometrics, Reliability, Test methods, Military requirements.
Identifiers: *Personal values, Concept models, Management information systems.

The report describes the development of an instrument to measure the personal values of naval officers. As a first step, the conceptual model underlying the measurement of values is explained. The model revolves around the meanings an individual attaches to a carefully selected set of concepts. This is followed by a description of the studies relating to measurement of personal value systems of managers, educational administrators, and army officers. Finally, the procedures used in developing a suitable personal values questionnaire (PVQ) for the Navy are explained. A thorough search of literature relating to the Navy yielded an initial pool of 200 concepts. These were then tested for their relevancy and reliability through sample surveys of naval officers. After eliminating the less relevant and less reliable concepts, the final PVQ has been developed which contains 86 concepts. (Author)
AD-711 358

MEASUREMENT OF TRAINING OUTCOMES.

Technical rept.,

University of Southern California Los Angeles
Dept of Psychology

Nicholas A. Bond, Jr., and Joseph W. Rigney. Jun 70, 43p* Rept no. TR-66

Contract N00014-67-A-0269-0012

Descriptors: (*Training, Effectiveness), (*Programmed instruction, Efficiency), Statistical analysis, Mathematical models, Decision theory, Standards, Test construction (Psychology), Learning, Experimental data, Performance (Human), Measurement.

Identifiers: Decision theory models, Adaptive control models, Simulation models, Evaluation.

Measurement of training outcomes as a requirement for evaluating new training techniques is one that is difficult to meet. Managers may have different concepts of what they want, than do the investigators. In the report, possibilities for measuring outcomes of training are surveyed, viewing training as a form of planned social change. Approaches which are discussed include adaptive control models, decision theory models, and simulation models. Illustrations from the CAI literature of recent attempts to measure training outcomes are given.
AD-711 302

SPECIFICATION OF TRAINING OBJECTIVES FOR COMPUTER-AIDED INSTRUCTION.

Technical rept.,

University of Southern California Los Angeles
Dept of Psychology

Nicholas A. Bond, Jr., and Joseph W. Rigney. Jun 70, 31p* Rept no. TR-65

Contract N00014-67-A-0269-0012

Descriptors: (*Training, Programming (Computers)), (*Programmed instruction, Effectiveness), Reviews, Teaching methods, Job analysis, Specifications, Data processing systems, Computers.
Identifiers: *Computer aided instruction, Training objectives.

The specification of training objectives, and the organization and implementation of courses around such objectives, is becoming a significant part of instructional technology. In the report, there is a brief review of some of the background for this development in earlier, related activities of job and task analysis. Requirements for the

specification of training objectives are discussed. The implications of data-processing technology for improved control over the specification and implementation of training objectives are illustrated in an example of how computer programs can generate criterion task specifications from relatively simple data bases, and compare student performance with these criterion tasks at a response-by-response level. (Author)
AD-711 301

PERSONNEL TRAINING AND DEVELOPMENT.

Technical rept.,
Minnesota Univ Minneapolis Dept of Psychology
John P. Campbell. Jun 70, 70p
Contract N00014-68-A-0141-0003

Descriptors: (*Industrial training, State-of-the-art reviews), (*Personnel management, Organizations), Social psychology, Operators (Personnel), Supervisory personnel, Learning, Motivation, Attitudes, Applied psychology, Teaching methods, Programming (Computers), Employee relations, Predictions.
Identifiers: Disadvantaged groups, Computer aided instruction.

The report, written for social scientists, constitutes a comprehensive review of the literature on organizational training and development, including skills training, supervisory training, training for disadvantaged workers, and management development. It begins by discussing recent developments in learning, motivation, and attitude theory which have relevance for the training and development problem. Particular attention is paid to the theory and techniques of behavior modification. The most recent developments in training techniques are outlined. Methods for training disadvantaged applicants and computer assisted instruction (CAI) are discussed. One section deals with research and evaluation methodology. Finally, empirical studies of training and development outcomes are reviewed. The bulk of the empirical literature is concentrated in three areas: laboratory education, programmed instruction, and training the disadvantaged. (Author)
AD-709 991

THE DEVELOPMENT OF A TEST FOR SELECTING RESEARCH PERSONNEL. TECHNICAL APPENDICES.

American Institutes for Research Pittsburgh Pa

Jan 50, 67p
Contract N7onr-370 (00)
See also AD-709 444.

Descriptors: (*Scientific personnel, Selection), (*Test construction (Psychology), Scientific personnel), Naval research, Standards, Behavior, Performance (Human), Reviews, Predictions, Aptitude tests, Performance tests.
Identifiers: *Personnel screening tests.

The test development project was a continuation study undertaken upon completion of an earlier project resulting in the determination of the critical requirements for scientific personnel. The objective of the research was development of selection instruments to measure aptitudes for scientific work. (Author)
AD-709 445

THE DEVELOPMENT OF A TEST FOR SELECTING RESEARCH PERSONNEL.

American Institutes for Research Pittsburgh Pa
Mary H. Weislogel. Jan 50, 41p
Contract N7onr-370 (00)
See also Appendices, AD-709 445.

Descriptors: (*Scientific personnel, Selection),

(*Test construction (Psychology), Scientific personnel), Naval research, Standards, Job analysis, Performance (Human), Reviews, Factor analysis, Statistical processes, Manpower studies, Aptitude tests, Performance tests.
Identifiers: *Personnel screening tests, Evaluation.

The report concerns a test development project carried out as part of a broad research program concerning scientific personnel. The long-range program includes: determination of the critical requirements for successful participation in research and engineering work; development of an aptitude test for the selection of scientific personnel; development of tests to measure proficiency in specific areas of scientific work; and development of procedures for evaluating the job performances of scientific personnel. (Author)
AD-709 444

MANAGEMENT PREPARES FOR COLLECTIVE BARGAINING AT THE NAVAL MISSILE CENTER.

Technical publication,
Naval Missile Center Point Mugu Calif
T. C. Lockhart. 20 Jul 70, 125p Rept no. NMC-TP-70-46

Descriptors: (*Naval shore establishments, Employee relations), (*Labor unions, Bargaining), (*Bargaining, Naval shore establishments), Management planning, Problem solving, Guided missiles, Effectiveness, Government employees, Contracts.
Identifiers: Minority groups.

The purpose of the report is to describe the problems facing the Naval Missile Center in dealing with labor unions. Although the Navy has historically been one of the key departments of the Federal government involved in labor relations, until recently little, if any, effect of employee organizations or employee unions had been experienced by the management of the Naval Missile Center. (Author)
AD-709 417

MEASUREMENT OF RESPONSIBILITY: A CRITICAL EVALUATION OF LEVEL OF WORK MEASUREMENT BY TIME-SPAN OF DISCRETION.

Working paper,
California Univ Berkeley Human Factors in Technology Research Group
Stephen Laner, Edward R. F. W. Crossman, and Henry T. Baker. Nov 69, 33p Rept no. HFT-69-10
Contract N00014-69-A-0200-1043

Descriptors: (*Performance (Human), Measurement), Research program administration, Naval research, Time, Job analysis, Organizations, Personnel management.
Identifiers: Time span technique, Work measurement, Evaluation, Responsibility.

The report gives a critical evaluation based on extended field trails and theoretical analysis of the time-span technique of measuring level of work in organizational hierarchies. It appears that the technique does possess many of the desirable features claimed by its originator, but that the earlier, less highly structured versions based on detailed job content analyses show more promise than the later shortened version. The critique is illustrated by field case study material wherever possible. (Author)
AD-708 767

RELIABILITY OF INDIVIDUAL VERSUS GROUP JOB PAY RATINGS,
Air Force Human Resources Lab Lackland AFB
Tex Personnel Research Div
Ralph S. Hoggatt, and Joe T. Hazel. May 70, 27p

AFHRL-TR-70-10

Descriptors: (*Wages, Standards), (*Job analysis, Reliability), Performance tests, Group dynamics, Test methods, Correlation techniques, Effectiveness, Management planning.
Identifiers: Individual ratings, Group ratings.

The study investigated two approaches for obtaining job ratings in order to determine which procedure provided the most stable ratings, given a constant number of raters. Specifically, it compared reliability estimates determined by averaging across individually obtained job ratings and reliability estimates based on consensus ratings from interacting panels. To investigate reliability of job ratings obtained from individuals and from groups or panels of raters, basic airman rated rated 100 brief job descriptions under three conditions: individually, in a 3-man panel, and in a 5-man panel. (Author)
AD-708 724

THE RELATIVE IMPORTANCE OF JOB FACTORS: A NEW MEASUREMENT APPROACH.

Technical rept.,
Stanley M. Nealey. May 70, 69p Rept no. TR-1
Contract N00014-67-A-0299-0011

Descriptors: (*Naval vessels (Combatant), Personnel management), (*Job analysis, Statistical processes), Job analysis, Attitudes, Correlation techniques, Factor analysis, Destroyers, Supervisory personnel, Group dynamics.
Identifiers: Job satisfaction, Military occupations, Personnel retention, Enlisted men.

The paper reports on a new two-phase measurement technique that permits a direct comparison of the perceived relative importance of economic vs. non-economic factors in a job situation in accounting for personnel retention, the willingness to produce, and job satisfaction. The paired comparison method was used to measure the preferences of enlisted men aboard a U. S. Navy destroyer for seven different job classifications, their supervisors, and seven groups of co-workers. In a second phase of the study, these three job factors were combined, together with various amounts of pay, to form two-factor composites. Multiple correlation was used to predict preferences for these composites from the job factor scale values obtained in phase one. Implications of the method and findings to the formation of personnel policy are considered. (Author)
AD-708 456

HUMAN RESOURCES ENGINEERING: A NEW CHALLENGE.

Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Gordon A. Eckstrand, William B. Askren, and Melvin T. Snyder. 1967, 5p Rept no. AMRL-TR-67-167
Availability: Pub. in Human Factors, v9 n6 p517-520 Dec 67.

Descriptors: (*Personnel management, Reviews), Management planning, Human engineering.

The concept of human resources engineering is introduced, which is the process of using human skill resources as factors in design trade-off studies. The development of the military's response to human resources needs in systems is traced from the reacting phase, through the current predicting phase, to a possible future phase involving some degree of control. The implementation of the control phase will require a human resources engineering technology. The establishing of such a technology will require research in the areas of data structuring, methods for relating data to design and life cycle costing, and computerized banks of human resources data. (Author)
AD-708 115

METHODOLOGY USED IN THE DEVELOPMENT OF QUALITATIVE PERSONNEL REQUIREMENTS INFORMATION FOR THE TACTICAL AIR CONTROL SYSTEM (SYSTEM 314L).

Research rept., Psychological Research Associates Inc Arlington Va
James F. Parker, Jr., Harold E. Price, and Peyton G. Walker, Sep 58, 36p Rept no. PRA-58-16
AFCRC-TN-58-70
Contract AF-41 (657)-176

Descriptors: (*Air traffic control systems, Air Force personnel), (*Air traffic controllers, Military requirements), Job analysis, Maintenance personnel, Tactical air support, Data processing systems.
Identifiers: AN/TSQ-13.

The procedures used in developing qualitative personnel requirements information (QPRI) for the operator and maintenance positions of the AN/TSQ-13 Data Processing Subsystem of the Tactical Air Control System 314L are described. End products derived from these procedures included: (1) Position definitions and resemblances of new positions to comparable positions in existing similar systems, (2) Preliminary manning estimates, (3) Training requirements for each new position, and (4) Operator performance analysis diagrams. (Author)
AD-707 832

THEORIES AND EXPERIMENTS ON INTERPERSONAL ATTRACTION.

Final rept. 1 Oct 58-30 Sep 69,
Pennsylvania Univ Philadelphia
Albert Pepitone. 1 May 70, 33p*
Contract Nonr-551 (27)

Descriptors: (*Personality, Interactions), (*Social psychology, Theory), Psychometrics, Emotions, Attitudes, Reaction (Psychology), Factor analysis, Performance tests, Social communication.
Identifiers: *Interpersonal attraction, Interpersonal hostility, Self evaluation.

The field of interpersonal and self evaluation has obvious practical relevance to the morale and cohesiveness of groups, the selection of partners for given tasks, and the formation of friendship relations, involving all behavior which is affected by these interpersonal and self evaluations. The study has approached and interpreted the phenomena of 'attraction and hostility' in terms of three theoretical frameworks. The report discusses these frameworks and evaluates them on the basis of experimental findings. (Author)
AD-706 046

CRITERIA FOR THE DESIGN OF NEW FORMS OF ORGANIZATION.

Final rept. 1 Dec 66-28 Feb 70,
Stanford Research Inst Menlo Park Calif
Howard M. Vollmer, and Joseph H. McPherson.
28 Feb 70, 15p* AFOSR-70-0947TR
Contract F44620-67-C-0039

Descriptors: (*Organizations, Experimental design), (*Management engineering, Standards), Theory, Behavior, Analysis of variance, Transformations, Personnel management, Interactions, Leadership, Group dynamics.
Identifiers: Innovation (Technology), *Management information systems.

Criteria and guidelines were developed for managers and consultants involved in the design of innovative kinds of organization in government or private settings, based upon case studies of major design efforts in a variety of federal government

and private organizations. These criteria and guidelines are formulated in terms of a general systems approach to organizational design, rather than a more limited engineering or behavioral approach. The systems approach considers the interactions of a number 99of (1) process variables, (2) external viewing variables, and (3) internal viewing variables in organizational systems. Particular attention is given to the design of organizational entities that accommodate to the needs, values, and aspirations of individuals and groups involved in these entities. (Author)
AD-705 702

TOP-MAN-X: A MANAGEMENT SIMULATION FOR INSTRUCTION IN TOTAL PROGRAMMING AND THE BASE ENGINEER AUTOMATED MANAGEMENT SYSTEM (BEAMS).

Final rept. Sep 67-Sep 69,
Technical Communications Inc Los Angeles Calif
Joel M. Kibbee, Leon Vickman, Ellen M. Dent, Luis F. Dominguez, and Arthur T. Stellmach. 26 Sep 69, 58p Rept no. TCI-SFN-2643 AFHRL-TR-69-20
Contract F33615-68-C-1076

Descriptors: (*Air Force operations, Management planning), (*Air Force training, Management planning), (*Management planning, *Teaching methods), Mathematical models, Simulation, Training devices, Inventory control, Maintenance, Personnel management, Game theory.
Identifiers: PPB (Planning Programming Budgeting), Planning programming budgeting, Total programming, Military planning, TOP-MAN-X management game.

TOP-MAN-X, a management game is used to assist in the instruction of USAF personnel in Total Programming. Total Programming is a USAF developed set of concepts and procedures for the optimum allocation of resources to the operation and maintenance of real property facilities on an Air Force base. TOP-MAN-X is a manual 'suitcase' management game. The report includes a short introduction to Total Programming, a discussion of TOP-MAN-X and the various steps in its development, and concludes with some remarks on the automation of both TOP-MAN-X and Total Programming. (Author)
AD-704 892

HUMAN FACTORS METHODS DEVELOPMENT AND TEST: I. EVALUATION OF THE CORRECTIVE MAINTENANCE BURDEN PREDICTION PROCEDURE.

Research memo.,
Naval Personnel and Training Research Lab San Diego Calif
Orvin A. Larson, and Joe E. Willis. Mar 70, 37p
Rept no. SRM-70-14

Descriptors: (*Electronic equipment, Maintenance), (*Performance (Human), Mathematical prediction), Naval research, Personnel management, Human engineering, Man-machine systems, Data processing systems.
Identifiers: *Corrective maintenance.

The report is to document an evaluation of the usefulness of the corrective maintenance burden (CMB) prediction procedure to applied systems research. The approach used was to analyze the basic structure of CMB and then to operationally apply CMB to an actual developing electronic system. CMB was applied to two dissimilar systems by the Applied Systems personnel researchers assigned to those systems. (Author)
AD-704 857

EMPLOYING THE TRAINING PROGRAM ENROLLEE: AN ANALYSIS OF EMPLOYER PERSONNEL RECORDS,

Rand Corp Santa Monica Calif
David H. Greenberg. Mar 70, 32p Rept no. P-4317

Descriptors: (*Retraining, *Personnel management), Records, Statistical analysis, Wages.

Increasing interest in and public commitment to training and retraining has resulted in a rapidly expanding number of evaluations of recent and current vocational and pre-vocational training programs. Data for these studies have invariably been collected from former trainees themselves. This paper utilizes data collected from former trainees themselves. This paper utilizes data collected for a pilot study designed to test the efficacy of an alternative approach: the collection of follow-up data from the personnel records of hiring companies. (Author)
AD-703 389

THE USE OF REWARDS IN MOTIVATING MARGINAL MEMBERS OF THE WORK FORCE.

Performance Research Inc Washington D C
Lyman W. Porter. 19 Feb 70, 29p* Rept no. PRI-364-2.1
Contract N00014-66-C-0130

Descriptors: (*Industrial psychology, Management planning), (*Motivation, Effectiveness), Feasibility studies, Performance (Human), Applied psychology, Social psychology, Social communication, Reaction (Psychology), Manpower studies.
Identifiers: Marginal personnel, Disadvantaged groups, Rewards.

The paper deals with the use of four groups of rewards (financial, interpersonal, intrinsic to work and developmental) for motivating individuals who have failed to demonstrate consistent work attendance or to meet organizationally defined standards of adequate performance. The paper emphasizes the importance of considering the sources of rewards and their method of administration, and considers the effects of these factors on attendance and performance. (Author)
AD-701 689

TRANSNATIONAL STUDY OF MANAGEMENT. FINAL REPORT TO THE FORD FOUNDATION 1966-1969.

Final rept. Sep 66-Sep 69,
Rochester Univ N Y Management Research Center
Bernard M. Bass, and Karamuthu M. Thiagarajan.
Dec 69, 35p*

Descriptors: (*Management engineering, *Training), (*Behavior, Industrial research), Statistical data, Organizations, Reviews, Data processing systems, Attitudes, Questionnaires, Factor analysis, United States, Europe, India.
Identifiers: Cross national research, Crossculture (Sociology), Data banks, Management information systems.

An international data bank on managerial behavior has been created which provides the basis for cross-cultural and cross-organizational research on individual, group and organizational behavior. This research program has also led to the development and testing of organizational simulations that serve both as vehicles for training and as research instruments. A worldwide network of institutions and individuals has been developed that systematically trains managers and provides standardized research data. An information system has been set up to receive, store, retrieve and disseminate research information. In workshop programs, management educators learned how to use materials and received what was often their first exposure to participative education. (Author)
AD-700 287

AN EXTENDED GOAL PROGRAMMING MODEL FOR MANPOWER PLANNING. APPENDIX AND PROTOTYPE EXAMPLE.

Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
A. Charnes, W. W. Cooper, R. J. Niehaus, and D. Sholtz. 6 Jun 69, 15p Rept no. RR-188
Contract Nonr-760 (24)

Descriptors: (*Management planning, Manpower studies), (*Manpower studies, Linear programming), Mathematical models, Personnel management, Predictions, Professional personnel, Budgets, Stochastic processes.
Identifiers: Goal programming.

The report uses the Personnel Automated Data Systems as a data base to develop a prototype example of its use in a goal programming model to develop net manpower requirements which take into account salary and budget data as well as stipulated manpower floors and ceilings in each relevant period. (Author)
AD-698 273

1968 SURVEY OF COMPENSATION OF DOD CIVILIAN SCIENTISTS AND ENGINEERS ENGAGED IN RESEARCH AND DEVELOPMENT.

Management Analysis rept.,
Office of the Director of Defense Research and Engineering Washington D C Office for Lab Management
E. M. Glass. 15 Jul 69, 294p Rept no. ODDRE-MAR-69-2

Descriptors: (*Scientific personnel, Wages), Statistical analysis, Education, Supervisory personnel, Tables, Department of Defense, Civilian personnel.

The purpose of the survey was to obtain information about the salaries and selected characteristics of both civilian and military scientists and engineers engaged in research, development, test and evaluation (RDT and E) as employees of the Department of Defense. This report covers information on civilian scientists and engineers only. A separate survey report on military scientists and engineers will be issued. (Author)
AD-696 084

THE CONDITIONING EFFECTS OF TECHNOLOGY ON ORGANIZATIONAL BEHAVIOR IN PLANNED SOCIAL CHANGE.

Technical rept. 1 Oct 68-1 Oct 69,
Michigan Univ Ann Arbor Inst for Social Research
James C. Taylor. 30 Sep 69, 108p
Contract N00014-67-A-0181

Descriptors: (*Industrial production, Sociometrics), Group dynamics, Motivation, Attitudes, Models (Simulations), Leadership, Supervision, Transformations, Statistical analysis, Social psychology.
Identifiers: Social change, Work groups, Resistance (Psychology), Production engineering, Technology.

Existant literature has suggested that sophisticated production technology tends to provide forces in the direction of increased work group autonomy, decision making and responsibility. The document presents a brief discussion of technology as a potential lever in organizational change, dealing with the notion of interrelatedness of subunits in organizational reaction to external change forces. These conclusions have resulted in the hypothesis that if sophisticated production technology leads to greater worker participation, and if this can be used as a force in planned organizational change in the direction of greater worker participation, then

planned change will be facilitated. A new model of technological classification is given -- one including elements of raw material input, and output control, as well as machines. (Author)
AD-694 995

THEMATIC EVALUATION OF MANAGEMENT POTENTIAL.

Final rept.,
Personnel Research and Development Corp., Cleveland, Ohio.
Erwin K. Taylor, Edwin C. Nevis, and Richard W. Wallen. Mar 64, 57p
Contract Nonr-4016 (00), Grant PHS-M-2158
Distribution Limitation now Removed.

Descriptors: (*Management engineering, Evaluation), Design, Test methods, Instruction manuals, Personnel management, Psychometrics, Behavior, Sociometrics, Social communication, Experimental data, Time, Standards, Reliability.
Identifiers: Thematic evaluation, Rating scales, Managerial potential, Scatter plots.
AD-434 732

M6 TECHNOLOGICAL RESOURCES

THE USE OF SYSTEMS TECHNIQUES IN CIVIL DEFENSE.

Final rept.,
Stanford Research Inst Menlo Park Calif
John F. Devaney. May 70, 186p
Contract DAHC20-67-C-0136
Prepared in cooperation with URS Research Co., San Mateo, Calif., Rept. no. URS-691.

Descriptors: (*Civil defense systems, *Systems engineering), Research program administration, State-of-the-art reviews, Training, Budgets, United States Government, Shelters, Cost effectiveness.
Identifiers: Evaluation.

Civil defense has the attributes of a system and the techniques of systems evaluation have been applied in the development of policy and programs since the middle 1950's. Advances have been made in the state-of-the-art of civil defense and of systems evaluation. Application of systems evaluation techniques to civil defense is reviewed. A modified analytic framework is presented with definitions, graphic aids, and a qualitative demonstration of the method and of its application to other activities such as: operational planning, organization, training, and so on. (Author)
AD-712 314

EVALUATION AND INNOVATION IN URBAN RESEARCH,

Rand Corp Santa Monica Calif
Garry D. Brewer. Aug 70, 49p Rept no. P-4446

Descriptors: (*Urban planning, Research program administration), (*Decision making, Mathematical models), Theory, Effectiveness, Attitudes, Programming (Computers), Problem solving, Philosophy.
Identifiers: Computerized simulation, Management information systems, Evaluation, Innovations.

Computer simulation is a relatively new methodology in the social sciences whose basic characteristics correspond quite well with the requirement to understand and manage complexly organized systems. However, the 'in principle' arguments advanced in support of the method have

been insufficiently tempered by honest appraisal of the 'in practice' experiences registered to date. Thus a continuation of existing trends could have harmful effects both for the method and for greater processes of problem-solving in the social context. An initial problem is the development of an appraisal function, a series of questions or criteria, against which a computer simulation may be judged. Several possible components of such a function are discussed, stressing the so-called policy-assisting class of simulation models. Several innovative recommendations are advanced that might alleviate the identified problem and aid eventual realization of the in principle myth. (Author)
AD-711 734

NEW DEVELOPMENTS IN TRANSPORTATION ANALYSIS: EVALUATION OF MIXES OF MODES IN ALTERNATIVE REGIONAL ENVIRONMENTS.

Rand Corp Santa Monica Calif
Frederick S. Pardee. Jul 70, 29p* Rept no. P-4425

Descriptors: (*Transportation, Statistical analysis), Urban areas, Networks, Rural areas, Costs, Population.

The purpose of the paper is to illustrate the application of recent methodological research on the analysis of alternative possible transportation investments. The work focused on the question of measuring incremental benefits to be derived from changing the current mix of modes available to provide transportation service to a region. (Author)
AD-711 035

COMMUNICATIONS SATELLITES, TECHNOLOGY TRANSFER, AND ECONOMIC DEVELOPMENT,

Rand Corp Santa Monica Calif
Paul L. Jordan. Jun 70, 13p Rept no. P-4347
Presented at AIAA Communications Satellite Systems Conference (3rd), Los Angeles, Calif. 6-8 Apr 70.

Descriptors: (*Television communication systems, *Education), (*Economics, Education), Communication satellites (Active), Mathematical analysis.
Identifiers: Transfer of technology, Underdeveloped countries.

The use of educational television to improve the quality and quantity of education in developing countries is examined. A simple model relating economic development in emerging countries to education and the level of applied technology is presented. The use of television broadcast satellites as a means for improving education systems in developing regions is discussed in the context of competition for scarce resources and the requirement to concurrently develop educational software and infrastructure. (Author)
AD-707 642

DEFENSE SYSTEMS RESOURCES IN THE CIVIL SECTOR.

Denver Research Inst Colo
John S. Gilmore, John J. Ryan, and William S. Gould. Jul 67, 212p ACDA-E-103
Contract ACDA/E-103
Availability: Paper copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 as AC12:D36/2.

Descriptors: (*Arms control, Economics), (*Disarmament, Economics), (*Industries, Disarmament), Systems engineering, Personnel, Management engineering, Transportation.

Identifiers: Management information systems, Civil market, *Defense industry.

The objectives of the study were to explore the nature of the systems capability of defense firms, and to evaluate the civil market for these defense firm resources as a field for diversification or conversion in the case of cutbacks in defense spending. To further these objectives, an analysis of recent attempts to apply defense systems capabilities to non-defense public sector projects was conducted. (Author)
AD-706 765

PLANNING THE MAN/ENVIRONMENT INTERACTION.

Final rept. 30 Apr 69-30 Apr 70,
Matrix Research Co Alexandria Va Area Systems Div
Robert D. Campbell, Lawrence Schlesinger, and Betty Jane Schuchman. 30 Apr 70, 317p
Contract N00014-69-C-0290

Descriptors: (*Humans, Environment), (*Ecology, Interactions), Naval shore establishments, Management planning, Behavior, Factor analysis, Models (Simulations), Questionnaires, Naval research, Data processing systems.
Identifiers: *Man environment interactions.

The purpose of the research has been to begin to develop a model of the environment-man relationship, the focus and integrating force of which is human growth and development. The model is to relate to the quality of living supported by the environment of a naval base. It is based on principles of man-environment relationships as these are guides to environmental design. (Author)
AD-706 043

A METHODOLOGY FOR EVALUATING HOUSING PROGRAMS.

Rand Corp Santa Monica Calif
Joseph S. DeSalvo. Apr 70, 35p Rept no. P-4364

Descriptors: (*Housing projects, Cost effectiveness), Mathematical models, Economics, Costs, Wages.
Identifiers: Evaluation, Benefit cost analysis, *Leasing.

The document is intended to provide a methodology for evaluating housing programs. A model of consumer choice in the rental housing market is developed. The consumer is assumed to be faced with fixed prices for the goods he buys except for housing. He is assumed to determine his expenditures on housing by choosing the set of characteristics which give him the quality of housing he desires. Assuming the consumer wants to get the most satisfaction for the expenditure of his income, conditions are derived which show how he will allocate his total expenditure between housing and nonhousing expenditures, how he will allocate his nonhousing expenditures among nonhousing commodities, and how he will allocate his housing expenditure on a particular quality of housing unit. (Author)
AD-705 883

THE ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS--A DATA BASE FOR URBAN PLANNERS.

Rand Corp Santa Monica Calif
E. J. Savage. Apr 70, 24p Rept no. P-4346
Presented at a meeting of the American Society for Public Administration, Berkeley, Calif., Feb 67.

Descriptors: (*Urban planning, Organizations), Management planning, Money, Urban areas.

Identifiers: *ACIR (Advisory Commission on Intergovernmental Relations), *Advisory commission on intergovernmental relations, State governments.

One institution that has been successful in engineering inter-level cooperation in our Federal System is the Advisory Commission on Intergovernmental Relations (ACIR). The paper examines ACIR from the standpoint of (1) origin, (2) structural composition, and (3) interests and accomplishments. Interwoven is a consideration of ACIR's unique features, including its policy role and an analysis of ACIR literature on government reorganization in metropolitan areas. (Author)
AD-705 543

A CASE STUDY IN URBAN DEVELOPMENT: FROM 'FACTORY TOWN' TO BALANCED COMMUNITY.

Rand Corp Santa Monica Calif
E. J. Savage. Apr 70, 29p Rept no. P-4345
Presented at California Univ., Graduate School of Public Administration, Berkeley, May 67.

Descriptors: (*Urban planning, *California), Management planning, Reviews, Advanced planning, Industries.
Identifiers: *Area planning and development, Richmond (California).

The paper attempts to analyze and assess Richmond's future prospects for successful growth as a well balanced California community. The analysis is construed in the light of Richmond's history as well as its present political, economic and social realities. (Author)
AD-705 541

UTILIZING THE CENTER CITY TRANSPORTATION PROGRAM TO INCREASE THE EFFECTIVENESS OF FEDERAL MANPOWER PROGRAMS.

Institute for Defense Analyses Arlington Va Urban Mass Transportation Project
Paul Hughes. Feb 70, 42p Rept no. N-693 (R)
IDA/HQ-69-10938
Contract DAHC 15-67-C-0011

Descriptors: (*Urban areas, Transportation), (*Transportation, Employment), Passenger vehicles, Feasibility studies, Commerce, Population, Training.
Identifiers: *Manpower programs, Public transportation systems.

The focus of the paper is on the utilization of the Center City Transportation Program (CTTP) to increase the effectiveness of federal manpower programs for the disadvantaged. The analyses will seek to determine (1) the applicability of mass transportation to the furtherance of the federal manpower program objectives, (2) the ability of existing manpower program delivery systems to accept mass transportation inputs, (3) the ways the CTTP might supply such inputs, and (4) how manpower programs can assist the CTTP. No attempt is made to judge the worth of these manpower programs. Rather, emphasis is placed primarily on how a specific application of mass transportation technology and programs can make a positive contribution to the realization of manpower program objectives which, since the early 1960s have been oriented more and more toward serving the disadvantaged. (Author)
AD-705 120

URBAN METAPOLICY AND URBAN EDUCATION.

Rand Corp Santa Monica Calif

Yehezkel Dror. Feb 70, 25p Rept no. P4314

Descriptors: (*Urban planning, *Decision making), (*Education, Urban areas), Organizations, Problem solving, Scientific research, Sociometrics, Training, Communication systems, Motivation.
Identifiers: Policy making.

The main thesis of the paper is that innovative changes in both urban metapolicy and in urban education are needed to meet present and future urban problems. Metapolicy deals with policies on policymaking, including the characteristics of the policymaking system and basic policy frameworks and postures. The analysis has important implications for urban educators. (Author)
AD-703 796

ON THE DIFFUSION OF INNOVATIONS RESEARCH TRADITION.

Final rept.,
Office of Research Analyses Holloman AFB N Mex
Gustavo M. Quesada. Nov 69, 48p Rept no. ORA-69-0016

Descriptors: (*Scientific research, Management engineering), (*Decision making, Reviews), Theory, Attitudes, Air Force research.
Identifiers: *Innovations, *Technology utilization, Technology transfer.

The report analyzes the decision-making process of the diffusion of technological innovations and attempts to make the analysis more meaningful for the Air Force by emphasizing the role of authoritarian, contingent, and collective type of decisions. The author describes the characteristics of innovations, different types of adopter categories (while emphasizing the role of the earlier adopters), and the diffusion process and adoption stages. (Author)
AD-701 001

HC\$3.00 MF\$0.65

M7 MANAGEMENT POLICY & PHILOSOPHY

CHRONIC MOVERS AND THE FUTURE REDISTRIBUTION OF POPULATION: A LONGITUDINAL ANALYSIS.

Rand Corp Santa Monica Calif
Peter A. Morrison. Oct 70, 30p Rept no. P-4440
Availability: Paper copy available from RAND Corp., Santa Monica, Calif. \$1.00. No copies furnished by DDC or NTIS.

Descriptors: (*Population, Mobility), (*Urban planning, Mathematical prediction), (*Performance (Human), Pattern recognition), Statistical distributions, Factor analysis, Rural areas, Attitudes, Regression analysis, Sociometrics, Dynamics.
Identifiers: Chronic residence changers.

A successful urban growth policy involves anticipating the effects of migration and future population distribution. The research reported attempts to identify quantitative relationships between individual - and household-level factors and the differential propensity to move. The findings indicate that redistribution of population may be largely influenced by habitual movers who change residence repeatedly and frequently. A second objective is concerned with improving techniques for projecting aggregate levels of mobility. The questions include how the effects of habitual movement are manifested at the metropolitan scale, and for predictive purposes, which aggregate indices hold the most important features of local population composition. (Author)
AD-713 429

MEASURING SOPHISTICATION OF PRODUCTION TECHNOLOGY: BACKGROUND, DEVELOPMENT, AND RESULTS.

Technical rept. 1 Oct 69-1 Oct 70,
Michigan Univ Ann Arbor Inst for Social Research
James C. Taylor. 1 Jul 70. 69p*
Contract N00014-67-A-0181-0013

Descriptors: (*Industrial production, Management engineering), Automation, Materials, Industrial equipment, Feedback, Factor analysis, Personnel management, Job analysis, Employee relations, Measurement, Models (Simulations), Statistical processes, Questionnaires.
Identifiers: *Production technology, *Sophistication, Management information systems.

The results presented in the paper suggest that, in general, production technology can be quantitatively measured. The particular measure described was checked for reasonably good reliability, validity, problems, and drawbacks. (Author)
AD-711 311

ADVANCED TECHNOLOGY AND WORK GROUP BEHAVIOR IN A SETTING OF PLANNED SOCIAL CHANGE: A REPLICATION STUDY.

Technical rept. 1 Oct 69-1 Oct 70,
Michigan Univ Ann Arbor Inst for Social Research
James C. Taylor. 1 Jul 70. 32p
Contract N00014-67-A-0181-0013

Descriptors: (*Behavior, Industrial psychology), (*Group dynamics, Analysis), Social psychology, Transformations, Management planning, Reviews, Scientific research, Leadership, Data processing systems, Attitudes, Automation, Test methods.
Identifiers: Technological change, Social change, Work groups.

The document reports on replication of a study design testing the effects of technology on autonomous group process, and on planned change programs directed toward participative management which tends to confirm the original findings. Advanced technology is correlated with more autonomous and participative group processes. Another result obtained in the original study, that advanced technology facilitates planned social change efforts, was also investigated. Consistency and similarity in the pattern of social system change were sought between the original findings and the replication results when data were controlled for the number of longitudinal measures, and when the total period used for planned change activities was ignored. (Author)
AD-711 310

AN EXTENDED CONCEPT OF 'MODEL',

Rand Corp Santa Monica Calif
E. S. Quade. Jul 70. 14p Rept no. P-4427
Presented at the International Federation of Operational Research Societies, Venice (Italy), Jun 69.

Descriptors: (*Model theory, Management planning), Industries, Commerce, Military organizations.
Identifiers: Delphi technique, *Systems analysis.

Operations research and systems analysis are now accepted, even extolled, as aids to management in commerce, industry, and defense. They are used not only to increase efficiency in routine operations but also to determine policies and actions, often at the highest levels. They have, however, not had, as yet, a corresponding acceptance for the solution of social and public problems. One handicap may be a bias toward too narrow a concept of model. (Author)
AD-710 639

FAMILY DISRUPTION DURING THE MOVING PROCESS.

Doctoral thesis,
Florence Heller Graduate School for Advanced Studies in Social Welfare Waltham Mass
Raymond M. Marsh. May 70. 224p

Descriptors: (*Military personnel, Deployment), (*Sociometrics, Distortion), Housing, Urban areas, Social communication, Transformations, Problem solving, Mobility, Statistical analysis, Attitudes, Questionnaires, Theses.

Identifiers: *Family disruption, Military families, *Residential relocations, Geographical mobility.

The disruptive influences operating on families during the moving process and while settling into a new community are rarely documented. The study is concerned with discovering the problems and hardships endured by the family of military personnel when relocation is required. Its specific purposes are to develop an objective description of the nature of the hardships endured by families while disengaging from one community and settling into another one; to draw practical implications for use in more effective planning for newcomers; and to provide data that will support policies that are more responsive to the needs of families in this state of transition. (Author)
AD-709 857

REMARKS ON SYSTEMS ANALYSIS FOR SOCIAL PROBLEMS.

Human Resources Research Organization Alexandria Va
Eugene A. Cogan. May 70. 12p Rept no. HUMRRO professional paper-15-70

Descriptors: (*Sociometrics, Problem solving), (*Management planning, Analysis), Education, Standards, Mathematical models, Data processing systems, Teaching methods, Personnel, Adaptive systems, Training.

Identifiers: *Systems analysis, Data banks, *Management information systems.

The need for more experience in how to adapt and apply the techniques of systems analysis to social and educational problems is stressed. Education and other social institutions, although very large activities, are managed as small independent units; therefore, adapting techniques from other applications and to form general decisions paradigms is mandatory. Use of system analysis techniques is essential to develop ways to solve social problems. For education, individualizing instruction to vastly improve the education process requires a systems analysis approach. (Author)
AD-709 500

COMMUNICATION IN RACIALLY INTEGRATED ORGANIZATIONS.

Technical rept.,
California Univ Irvine
Lyman W. Porter, and Robert Dubin. 15 Jun 70. 49p* Rept no. TR-1
Contract N00014-69-A-0200-9001
Report on Individual-Organizational Linkages.

Descriptors: (*Social communication, Organizations), (*Employment, Group dynamics), Problem solving, Semantics, Attitudes, Factor analysis, Behavior, Reliability.
Identifiers: *Racially integrated organizations, Ethnic groups.

The paper deals with the problem of communication in organizational settings, as such communication is affected by work forces composed of different racial backgrounds. It is limited to communication in organizational settings involving employment. Major topics dealt with involve the interracial context of communication, the communication process, and organizational structural fac-

tors. The final sections of the paper present summary conclusions, implications for practice, and research needs. (Author)
AD-708 761

AN EXPLORATION OF THE CONCEPT OF LOGISTICS: A CONSTITUTIVE APPROACH.

Doctoral thesis,
Arizona State Univ Tempe Coll of Business Administration
Graham Wharton Rider. Jun 70. 224p

Descriptors: (*Logistics, Philosophy), Classification, Armed Forces operations, Commerce, Programmed instruction, Universities, Standards, Theses.

Identifiers: *Business logistics, *Military logistics, Concepts, Systems analysis.

Constructs, or idea symbols, of logistics were developed at three levels of definition: as a socioeconomic function; as a set of system processes; and as a set of work-functions. Three such definitions were developed. Research of secondary data developed constructs which constituted two explanatory definitions: business logistics and military logistics. The survey of university professors developed a third definition which was used for comparative purposes. In essence, the three represented differing philosophies of logistics. (Author)
AD-708 743

MIDDLE MANAGERS' EXPECTATIONS OF THE FUTURE WORLD OF WORK: IMPLICATIONS FOR MANAGEMENT DEVELOPMENT.

Technical rept.,
Rochester Univ N Y Management Research Center
John A. Haas. Feb 69. 202p Rept no. TR-26
Contract N00014-67-A-0398-0002
Doctoral thesis. Prepared in cooperation with Pittsburgh Univ., Pa. Graduate School of Business.

Descriptors: (*Management engineering, Advanced planning), Job analysis, Mathematical prediction, Training, Performance (Human), Philosophy, Automation, Human engineering, Decision making, Transformations, Problem solving, Questionnaires, Organizations, Theses.
Identifiers: *Future world of work, *Management information systems.

The future world of work has been the subject of considerable prognostication by scholars and businessmen, particularly recently. While these predictions differ widely, they unanimously augur a world vastly different from the present one. Today's middle manager, therefore, is faced with the very real danger of becoming obsolete--today's skills and knowledge will not enable him to effectively manage tomorrow's corporation. The purposes of this study are: (1) to provide a means by which managers may assess the future world of work and to describe it by means of these assessments; (2) to compare present with past predictions of the same future point in time, in order to identify continuing and changing trends; and (3) to examine the effect an assessment of the future has on managers' subsequent plans for their own training and development. (Author)
AD-706 105

AUTOMATION: SOME PIONEERING MILITARY APPLICATIONS.

System Development Corp Santa Monica Calif
David C. Phillips. Jan 70. 42p Rept no. SDC-SP-3465

Descriptors: (*Computers, *Armed forces operations), Automation, Data processing systems, Management planning, Command + control systems, Mathematical models, Simulation, Man-

machine systems, Attitudes, Armed forces research.
Identifiers: Computerized simulation.

The diversity of computerized systems is examined, with emphasis upon innovative applications by the military services. The limitations and the advantages of computers are highlighted in an attempt to determine the extent to which man has reacted to this technical revolution. (Author)
AD-704 862

PLANNING BY MAN-MACHINE SYNERGISM: A CHARACTERIZATION OF PROCESSES AND ENVIRONMENT,
System Development Corp Santa Monica Calif
Aiko M. Hormann. 31 Mar 70, 91p Rept no. SDC-SP-3484/000/00
Contracts DAHC15-67-C-0149, Nonr-4745 (00)

Descriptors: (*Management planning, *Man-machine systems), Problem solving, Decision making, Programming (Computers), Uncertainty.
Identifiers: *Man machine synergism.

The paper describes an attempt to couple the complementary capabilities of man and machine in the context of planning and creative problem solving. Some real-world problems to which man-machine techniques can be fruitfully applied are characterized, and the types of decision dynamics influenced by these characteristics are identified. Then, how man tends to handle complexity and uncertainty is discussed in terms of the concept of 'cognitive economy.' Next, characteristics of planning processes are discussed in terms of the hierarchical, iterative nature of planning and the stages of problem solving (goal setting, alternative generation, consequence estimation, and evaluation and alternative selection). Structural attributes extracted from such characterization constitute the basic framework and guiding mechanism for interaction in Gaku, a system of computer programs designed as a step toward man-machine synergism. Features of Gaku are then described in terms of both built-in capabilities that are relatively problem independent and man-machine actions for dynamic extension of these capabilities that are problem dependent and user oriented. The latter can be seen to make the system increasingly useful and powerful as a 'co-evolving' man-machine team. (Author)
AD-704 810

COUPLING OF SCIENCE TO TECHNOLOGICAL DEVELOPMENT (REVIEW OF CONCEPTS AND LESSONS ABOUT RESEARCH AND DEVELOPMENT COUPLING: THE IMPLICATIONS FOR RESEARCH AND DEVELOPMENT POLICIES),
Office of Aerospace Research Arlington Va
Alexander G. Hoshovsky, and Ernest P. Luke. Oct 69, 17p Rept no. OAR-69-0022

Descriptors: (*Scientific research, *Research program administration), Social communication, Scientific personnel, Reviews, Interactions, Information retrieval.
Identifiers: *Research and development, Research management, Information transfer.

The paper defines coupling as a multidirectional flow of information which brings the social problems, goals and requirements into productive association with the potential of science and technology. It describes coupling dimensions and reviews a number of lessons derived from experience of those who performed or aided in the performance of coupling functions. The report concludes that productive science-technology coupling usually occurs as a by-product of other worthwhile objectives and seldom as a result of the management's attempt to show that productive coupling exists. The adequacy of coupling can be

evaluated only if there is a clear definition of what kind of coupling is being considered. Since there are many natural and man-made obstacles to coupling, successful coupling programs require strong support of top and middle managements, presence of clear and challenging objectives, existence of reasonably attractive incentives and commitment of adequate resources. (Author)
AD-704 569

ARMY MANAGEMENT VIEWS, VOLUME XV, BOOK 1,

Army Management School Fort Belvoir Va
Charles W. Dahlgren, and Murray Summers. Mar 70, 228p
See also Volume 14, Book 2, AD-703 966.

Descriptors: (*Army operations, *Management engineering), Theory, Test facilities, Leadership, Problem solving, Mathematical prediction, Industrial production, Operations research, Weapon systems, Decision making, Communication systems, Personnel management, Creativity, Reports.

Identifiers: *Management information systems, Systems analysis.

Contents: Management theory, Command management, Installation management, Industrial management, Operations research, Procurement management, Personnel management, and Creative problem solving.
AD-703 967

ARMY MANAGEMENT VIEWS, VOLUME XIV, BOOK 2,

Army Management School Fort Belvoir Va
Charles W. Dahlgren, and Murray Summers. Nov 69, 214p
See also Volume 14, Book 1, AD-695 670.

Descriptors: (*Army operations, *Management engineering), Data processing systems, Housing, Personnel management, Budgets, War games, Creativity, National defense, Reports.
Identifiers: *Management information systems, Systems analysis.

Contents: Installation management, Test and evaluations, Defense management, Manpower management, Money management, Linear programming, War games, Information systems, Data systems management, and creative potential.
AD-703 966

THREE VIEWS OF THE EXPERT'S ROLE IN POLICY-MAKING: SYSTEMS ANALYSIS, INCREMENTALISM AND THE CLINICAL APPROACH,

Rand Corp Santa Monica Calif
K. A. Archibald. Jan 70, 26p Rept no. P-4292

Descriptors: (*Management planning, Decision making), (*Organizations, Effectiveness), Professional personnel, Factor analysis, Systems engineering, Problem solving, Cost effectiveness.
Identifiers: Policymaking, Program budgeting, Systems analysts.

The main purpose of the paper is to compare the systems analytic approach and the clinical approach to policy making and thus suggest why some sort of interaction between them could be fruitful. (Author)
AD-701 045

PROLEGOMENA TO POLICY SCIENCES,

Rand Corp Santa Monica Calif
Yehezkel Dror. Jan 70, 36p Rept no. P-4283

Presented partly at the Annual Meeting of the

American Association for the Advancement of Science (136th), Boston, Mass., 26-31 Dec 69 and the Annual Meeting of the American Political Science Association (65th), New York, 2-6 Sep 69.

Descriptors: (*Management planning, Philosophy), (*Decision making, Theory), Operations research, Systems engineering, Factor analysis, Social psychology, Mathematical prediction.
Identifiers: *Policy sciences, Systems analysis.

The document discusses the value of policy sciences in relation to operations research, systems analysis, strategy, and operational concepts and limitations.
AD-700 173

INSTITUTIONAL SELF-ORGANIZATION, EXPLOITATION OF RECENT ADVANCES IN THE PRESCRIPTIVE SCIENCES,

Research Analysis Corp McLean Va
Milton Marney. Oct 69, 29p* Rept no. RAC-P-53

Descriptors: (*Social sciences, Problem solving), (*Problem solving, Adaptive systems), (*Organizations, Decision making), (*Decision making, Reasoning), Management planning, Decision theory, Social psychology, Sociology, Culture, Operations research, Optimization, Scientific research, Selection, Substitutes.
Identifiers: Technological progress, Cultural complexity, Cognitive relativism, Social adaptivity, Concept formation.

The rampant acceleration of scientific advance and technological change that seems to be required for national preeminence unfortunately entails disconcerting human consequences: explosive increases in cultural complexity with ominous possibilities for massive social disruption. The attainment of social adaptivity, as an ideal resolution of this situation, can be predicated only on the basis of sophisticated improvements of rational control throughout the hierarchical range of institutional decision making. Recent advances in the management sciences, when exploited in an institutional version of a self-organizing system, constitute promising theoretical resources for extending the present scope of rational decision. A feasible design for a national administrative research agency is put forward, in concept, as an institutional prototype embodying the innovative organizational format needed to connect theoretical resources with practical aspects of social problem solving. The significance of this prototype lies in its implication for a deliberately self-transforming society, a purposefully adaptive version of the social order. (Author)
AD-699 334

PERSPECTIVES ON PUBLIC-SYSTEMS GAMING,

Technical paper,
Research Analysis Corp McLean Va
Lester G. Hawkins, Jr. Nov 69, 75p Rept no. RAC-TP-375
Contract DAHC19-69-C-0017

Descriptors: (*Management planning, Social sciences), (*Decision making, Game theory), Sociometrics, Programming (Computers), Models (Simulations), Behavior, Environment, Research program administration, Political science, Economics, Pattern recognition, California, Pennsylvania.
Identifiers: Socioeconomic gaming, *Public systems gaming, Policymaking, San Francisco Game (California), Pittsburgh Game (Pennsylvania).

The paper explores the possibilities for the extension of operational gaming to the public-systems sector and evaluates the potential of nonprofit government-agency-serving systems-research or-

ganizations to operate in the nonmilitary public-policy field. The larger part of the effort thus far expended in the development of socioeconomic games has been in the area of urban-development or community-renewal planning, and this dominance will likely continue, although some difficulty in communication between game contractors and clients has been experienced. However, the author believes these difficulties can be overcome and suggests several ways of accomplishing this. (Author)
AD-697 712

MANAGEMENT, PRODUCTIVITY, AND GROWTH,
Rand Corp Santa Monica Calif
Charles Wolf, Jr. Nov 69, 18p Rept no. P-4244
Presented at the Top Management Symposium of the Asian Productivity Organization, Tokyo (Japan), Hong Kong, 22 Oct-1 Nov 69.

Descriptors: (*Economics, Foreign policy), (*Commerce, Asia), Management planning, Interactions, Industrial production, Growth, Organizations, Symposia.
Identifiers: Economic cooperation.

The document is concerned with the role that top management can play in an extension of international economic cooperation, through exchanges of information and through an awareness of ideas, needs and potentialities for cooperative endeavor. Opportunities for economic cooperation among the countries of Asia and between them and the countries outside are deemed much greater than narrow geographical considerations alone would suggest. (Author)
AD-697 676

INDEPENDENT PUBLIC POLICY ANALYSIS ORGANIZATIONS—A MAJOR SOCIAL INVENTION,
Rand Corp Santa Monica Calif
Roger E. Levien. Nov 69, 22p Rept no. P-4231
Presented at the Faculty Colloquium of the Interdisciplinary Systems and Cybernetics Project, Program of Policy Studies in Science and Technology, Washington, D. C., 14 Feb 69.

Descriptors: (*Management planning, Analysis), (*Organizations, Effectiveness), United States Government, Problem solving, Reviews, Decision making, Costs, Transformations.
Identifiers: Policymaking, Public policy analysis.

The thesis of the paper is that the truly distinguishing characteristic of independent policy analysis organizations is their role as independent organizations that provide analytic assistance to government agencies in the resolution of public policy issues.
AD-697 477

DEVELOPING A STRATEGY OF ORGANIZATIONAL CHANGE FOR THE DEPARTMENT OF STATE,
Rand Corp Santa Monica Calif
Marshall W. Wiley. Nov 69, 32p Rept no. P-4097

Descriptors: (*United States Government, Management planning), (*Organizations, Reviews), Decision making, Foreign policy, Problem solving, Budgets, Personnel, Data processing systems, Leadership.
Identifiers: State Department, Policymaking, Organizational modification.

The document, in considering the operation of the foreign affairs community, is addressed to the organization and management problems of the State Department. (Author)
AD-697 373

TEACHING OF POLICY SCIENCES: DESIGN FOR A DOCTORATE UNIVERSITY PROGRAM,
Rand Corp Santa Monica Calif
Yehzekel Dror. Nov 69, 41p Rept no. P-4128-1

Descriptors: (*Management engineering, Programmed instruction), (*Professional personnel, Training), Teaching methods, Textbooks, Aptitude tests, Universities, Standards, Attitudes, Students.
Identifiers: Policy sciences, *Doctorate degrees, Policymaking.

The main operational purpose of the paper is to encourage thought and action on the teaching of policy sciences at universities. In order to do so, the paper presents a prototype design for a doctorate university program in policy sciences. A further purpose is to encourage search for program designs which fit differing conditions. (Author)
AD-697 056

ARMY MANAGEMENT VIEWS, VOLUME XIV, BOOK 1,
Army Management School Fort Belvoir Va
Charles W. Dahlgren, and Murray Summers. Jul 69, 245p
See also Volume 13, Book 2, AD-688 097.

Descriptors: (*Army operations, *Management engineering), Reports, National defense, Data processing systems, Military facilities, Housing, Operations research, Cost effectiveness, Problem solving, Creativity, Personnel management, Models (Simulations).
Identifiers: Information systems, Systems analysis.

Contents: Command management; Information systems; Military facilities; Housing; Operations research; Systems analysis; Cost effectiveness; Creative thinking; and Personnel management.
AD-695 670

ARMY MANAGEMENT VIEWS, VOLUME XIII, BOOK II,
Army Management School Fort Belvoir Va
John M. Schwalje, and Murray Summers. 1968, 253p

Descriptors: (*Army operations, *Management engineering), Operations research, Military facilities, Armed forces transportation, Manpower, Personnel management, Data processing systems, Costs, Value engineering.
Identifiers: Systems analysis.

Brief articles are presented on operations research, systems analysis, Army installation management, family housing management, transportation, manpower management, automatic data processing, cost reduction program, work measurement program, value engineering. (Author)
AD-688 097

M8 ECONOMICS

PROGRAM BUDGETING: ITS UNDERLYING SYSTEMS CONCEPTS AND INTERNATIONAL DISSEMINATION,
Rand Corp Santa Monica Calif
David Novick, and Daniel J. Alesch. Sep 70, 28p*
Rept no. P-4462

Descriptors: (*Management control systems, Systems engineering), Theory, Budgets, Analysis, United States Government, Industries, Standards, Government (Foreign).
Identifiers: *Program budgeting, Concepts, Planning programming and budgeting systems.

In the document, program budgeting has been

viewed as an aid to government in its role of guiding and managing social, economic and environmental systems within government's jurisdiction. The origins of the planning-programming-budgeting system have been traced and its development in the United States and world-wide has been described. Concepts from general systems theory and from cybernetics are rooted in the approaches which characterize program budgeting. Implementation in numerous countries throughout the world illustrates the flexibility of the system. (Author)
AD-711 903

EFFECTS OF THE PROPERTY TAX ON OPERATING AND INVESTMENT DECISIONS OF RENTAL PROPERTY OWNERS,
Rand Corp Santa Monica Calif
Joseph S. DeSalvo. Aug 70, 11p Rept no. P-4437

Descriptors: (*Buildings, Management planning), (*Economics, Buildings), Factor analysis, Urban planning, Impact, Mathematical models.

Identifiers: *Property taxes, Management information systems, Investments, Rental property.

The paper is concerned with an aspect of the resource allocative effects of the property tax. It investigates the effects of the tax on investment and operating decisions of rental property owners. Of particular interest is the question of 'upgrading.' (Author)
AD-711 783

AN ECONOMIC ANALYSIS OF THE RELATIONSHIP BETWEEN INTER-REGIONAL SUBCONTRACTING AND THE REGIONAL ECONOMIC IMPACT OF SELECTED REDUCTIONS IN DEFENSE EXPENDITURES,
Master's thesis,
Maryland Univ College Park
Tadeus Lucian Jakubowski. 1 Aug 68, 140p

Descriptors: (*Department of Defense, *Contracts), (*Federal budgets, Reduction), (*Economics, Impact), Mathematical models, Statistical distributions, Data processing systems, Correlation techniques, Money, Factor analysis, Management planning, Theses.
Identifiers: *Subcontracting, Economic analysis, Management information systems.

The paper presents an analysis of the subcontracting network of the United States defense industry. Primary emphasis is placed on the inter-regional subcontracting flow. An inter-regional subcontracting matrix for both 1965 and 1966 is established and presented. With these matrices, and using a modified input/output type model, it is shown how this technique can be used to study the economic impact on various regions resulting from selective reductions in defense expenditures. A major effort was made to examine the stability of the inter-regional coefficients. The inter-regional (I-A) matrix is included along with its inverse for both 1965 and 1966. (Author)
AD-709 240

DEFENSE BUDGETING: ORGANIZATIONAL ADAPTATION TO EXTERNAL CONSTRAINTS,
Rand Corp Santa Monica Calif
John P. Crecine. Mar 70, 72p Rept no. RM-6121-PR
Contract F44620-67-C-0045
Availability: Paper copy available from The Rand Corp., 1799 Main Street, Santa Monica, Calif. 90406. \$2.00.

Descriptors: (*Department of Defense, Budgets), (*Management planning, Reviews), Decision making, Factor analysis, Mathematical prediction, Models (Simulations), Environment, Flow chart-

ing.
Identifiers: Constraints, PBBS (Planning Programming Budgeting Systems), Planning programming budgeting systems.

The document gives a detailed review of the annual Department of Defense budgetary process. In spite of many differences in necessary procedures under PBBS, adopted by DOD in 1961, methods of arriving at dollar figures for line items in the appropriations request are not dissimilar to those of the 1950s—namely, a prior determination of the total for defense and a cutting of service requests to meet an overall target figure. Actual military programs are rarely considered on their merits alone (as PBBS proponents intended they should be), but must be brought into line at the end of the budget cycle. (Author)
AD-708 424

ARE COST OVERRUNS A MILITARY-INDUSTRY-COMPLEX SPECIALTY,
Rand Corp Santa Monica Calif
David Novick. Mar 70, 7p Rept no. P-4311

Descriptors: (*Costs, Armed Forces procurement), (*Management planning, Reviews), Problem solving, Inequalities, Errors, Design, Construction, Predictions.
Identifiers: Cost overruns, Original estimates, Cost control.

The document presents the view that in the design, procurement, and production of future goods, errors will always be made, whether in the purchase of new space vehicles for government use, the introduction of new power plants by privately owned electric companies, or the purchase of new office buildings and homes by private individuals. This has been the case since Roman times and can be expected to continue in the foreseeable future. (Author)
AD-703 861

PRICES AND THE GUIDEPOSTS: THE EFFECTS OF GOVERNMENT PERSUASION ON INDIVIDUAL PRICES,
Rand Corp Santa Monica Calif
Arthur J. Alexander. Jan 70, 32p Rept no. P-4284

Descriptors: (*Economics, Management planning), (*Costs, Decision making), (*Wages, Control), United States Government, Industrial relations, Impact, Statistical data, Regression analysis.
Identifiers: Confrontations, Price control, Wage control, Government policies.

Wage-price guideposts were part of the government's economic policy from 1962 to 1968. A particular method of policing the guideposts evolved during this period. The Administration sought, through public and private confrontations, to influence the pricing decisions of firms. The document describes briefly the policy of confrontation, proposes several alternative hypotheses to explain the resultant behavior of firms, and analyzes statistically those variables predicted to be associated with government success and failure in influencing firm behavior. (Author)
AD-700 319

A SIMPLE HYPOTHESIS OF INCOME DISTRIBUTIONS,
Rand Corp Santa Monica Calif
Joseph P. Newhouse. Jan 70, 27p Rept no. P-4116-1

Descriptors: (*Wages, Statistical distributions), Mathematical prediction, Economics, Theory, Approximation (Mathematics), Correlation

techniques, Factor analysis, Urban areas.
Identifiers: Income studies, Human capital theory.

The key assumption of the paper, namely a constant industry wage structure and level across areas, is an approximation. The relevant question is how well the approximation serves for predicting income distribution. The size of the canonical correlation coefficients show that for predicting the distribution of incomes across states the assumption serves quite well. (Author)
AD-699 922

GOVERNMENT-OWNED PLANT EQUIPMENT FURNISHED TO CONTRACTORS: AN ANALYSIS OF POLICY AND PRACTICE,
Rand Corp Santa Monica Calif
Edward Greenberg. Dec 69, 57p Rept no. RM-6024-1-PR
Contract F44620-67-C-0045

Descriptors: (*Air Force procurement, *Contracts), (*Industrial equipment, Control), Management planning, Analysis, Decision making, Industrial relations, Costs, Motivation.
Identifiers: Government policies, Competition, Contractors.

An analysis is made of government policy and practice in providing contractors with industrial plant equipment; contractor motivations to accept such equipment; and alternatives to current policy. The government prefers that contractors furnish their own equipment for several reasons: Ideologically, in a free-enterprise economy, firms should supply their own equipment. It is difficult to control a large inventory in scattered locations. The practice tends to restrict competition by conferring advantages on contractors possessing the equipment. (Author)
AD-699 553

SYSTEM ACQUISITION EXPERIENCE,
Rand Corp Santa Monica Calif
R. L. Perry, D. DiSalvo, G. R. Hall, A. J. Harman, and G. S. Levenson. Nov 69, 55p Rept no. RM-6072-PR
Contract F44620-67-C-0045

Descriptors: (*Armed Forces procurement, Costs), Contracts, Performance (Engineering), Predictions, Weapon systems.

An analysis of 21 military acquisition programs to see how closely original estimates of cost and performance compare with actual outcomes, and whether there has been any improvement in estimating outcomes in the 1960s over the preceding decade. Quantitative findings are reported as ratios of actual results to initial estimates based on the Technical Development Plan. Cost growth seemed to be the result of adjustments of target goal. Estimates seemed to be somewhat less biased toward optimism in the 1960s, but it is uncertain whether this was due to improved estimating or to improved control of program fluctuations. Performance characteristics factor numbers had a broad distribution, with some better than expected outcomes but also with some sizable shortfalls. The research indicates the need for continuing efforts to control the cost, schedule, and article performance outcomes of programs and for better understanding of the causes for program growth. (Author)
AD-698 732

M9 GENERAL

THE SCIENTIFIC MANAGEMENT OF SOCIETY (ESSAY OF A SYSTEMATIC INVESTIGATION) SELECTED CHAPTERS,

Foreign Technology Div Wright-Patterson AFB Ohio
V. G. Afanasev. 20 Feb 70, 200p Rept no. FTD-HT-23-94-69
Edited trans. of mono. Nauchnoe Upravlenie Obshchestvom (Opyt Sistemnogo Issledovaniya), n.p., 1968 p1-6, 98-384.

Descriptors: (*Sociometrics, USSR), (*Communism, Group dynamics), Management planning, Social sciences, Control systems, Problem solving, Cybernetics.
Identifiers: Translations.

According to the author, the theory of management of society has a great potential for the future. He investigates the main aspects of this new science, underscores the role of the Party in guiding the building of communism, and analyzes the principles of scientific management. He also studies how socialist society is managed, describes modern management techniques, and criticizes contemporary bourgeois theories and practices of social control under capitalism.
AD-706 166

CIVIL DEFENSE SYSTEMS: SOCIAL IMPACT AND MANAGEMENT PLANNING. VOLUME I.
Report bibliography Aug 60-Oct 69.
Defense Documentation Center Alexandria Va

May 70, 157p Rept no. DDC-TAS-70-45-1

Descriptors: (*Civil defense systems, Bibliographies), (*Management planning, Civil defense systems), Management planning, Attitudes, Public opinion, Manpower, Economics, Training, Radioactive fallout, Shelter, Civil defense personnel.

This bibliography is Volume I of a two-volume set of references on Civil Defense Systems: Social Impact and Management Planning. Documents contained in this volume pertain to management training, public opinion, social impact, and psychological effects. Computer-generated indexes of Corporate Author-Monitoring Agency, Subject, and Contract are provided.
AD-705 500

MANAGEMENT INFORMATION SYSTEMS. VOLUME I.
Report bibliography May 44-Oct 69.
Defense Documentation Center Alexandria Va

Apr 70, 288p* Rept no. DDC-TAS-70-43-1

Descriptors: (*Management control systems, *Bibliographies), Information retrieval, Management planning, Decision planning, Time sharing, Digital computers, Man-machine systems, Logistics.
Identifiers: *Management information systems, Information processing, User oriented computer systems, Annotated bibliographies.

The bibliography contains annotated references to the aspects of the management information systems available in the Defense Documentation Center's data bank. Corporate Author-Monitoring Agency, Subject, and Personal Author indexes are included in this bibliography. (Author)
AD-704 960

SMALL GROUP DYNAMICS. VOLUME I.
Report bibliography Aug 52-Mar 69.
Defense Documentation Center Alexandria Va

Feb 70, 489p* Rept no. DDC-TAS-69-78-1

Descriptors: (*Group dynamics, *Bibliographies), Adjustment (Psychology), Applied psychology, Attitudes, Behavior, Social psychology, Decision making, Reaction (Psychology), Performance (Human), Social communication, Confinement (Psychology), Leadership.

Identifiers: *Small groups, Interpersonal relations, Group therapy.

The bibliography contains annotated references to small groups of twenty subjects or less. The reports are on the adjustments, interpersonal relations, task effectiveness, and performance under various conditions. Decision making, attitudes and responses are some of the factors analyzed in the reports on group dynamics. The individual entries are arranged in AD number sequence. The computer-generated indexes are Corporate Author/Monitoring Agency and Personal Author. (Author)
AD-703 600

A COMPENDIUM OF AUTHENTICATED LOGISTICS TERMS AND DEFINITIONS,
Air Force Inst of Tech Wright-Patterson AFB Ohio
School of Systems and Logistics
Fred Gluck. Jan 70, 539p* AFIT-TR-5

Descriptors: (*Dictionaries, Logistics), Problem solving, Handbooks, Instruction manuals, Sources.
Identifiers: Abbreviations, Definitions, Logistics management, Management information systems.

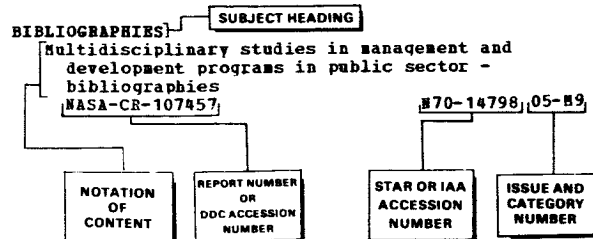
The document contains a collection of logistics terms and definitions and the source documents in which these definitions can be found.
AD-700 066

Subject Index

MANAGEMENT / a continuing literature survey

MAY 1971

Typical Subject Index Listing



A Notation of Content, rather than the title of the document, appears under each subject heading; it is listed under several headings to provide multiple access to the subject content. The STAR or IAA accession number is located beneath and to the right of the Notation of Content, e.g. N70-14798. Under any one subject heading, these accession numbers are listed in ascending order in each series. For DDC items the accession number appears in the report number location.

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ACQUISITION MANAGEMENT

- DOD systems acquisition management tools and policies, emphasizing role of development concept paper and outside personnel dialogue in DOD decision making N70-16460 05-M1
- Integrated USAF acquisition management systems approach engaging top management abilities available in government and industry N70-16463 05-M1
- Computer aided design programs as decision-making tool for fighter development project technical management A70-23024 05-M4
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- Project ABLE methodology applied to systems developed through parallel prototypes AD-707851 05-M4

B

BIBLIOGRAPHIES

- Multidisciplinary studies in management and development programs in public sector - bibliographies NASA-CR-107457 N70-14798 05-M9
- Accuracy of cost information for decision making - bibliographies NASA-CR-109181 N70-21107 05-M9
- Annotated bibliography of books on management NASA-TM-X-62945 N70-29979 05-M9
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- Bibliography on small group dynamics - Vol. 1 AD-703600 N70-35482 05-M9
- Aging, creativity, inter-speciality mobility, retraining, and technical obsolescence of scientific and engineering personnel - selected bibliography NASA-CR-112776 N70-37083 05-M9
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- Annotated bibliography on management planning and social impact of Civil Defense Systems AD-705500 05-M9
- Government/industry relations and problem solving in acquisition management AD-707731 05-M2

C

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- Technology transfer techniques within business firm, including specific examples used by successful companies A70-12635 05-M6
- Technology transfer between large company aerospace group and commercial products group A70-12636 05-M6
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computer systems under hardware and power
failures, fire, and workload surge
AD-705341 05-M4
Design and utilization methods for data processing
systems discussing systems effectiveness
AD-708725 05-M1
Data management methods and information systems
design and utilization
AD-708726 05-M1
Information systems design and utilization with
emphasis on data processing languages
AD-708727 05-M1
Computer applications to instruction, inventory
system design, film generation, and algebra
AD-708728 05-M1
Information systems design and utilization
discussing data management of associative memory
systems
AD-708729 05-M1
Economies of scale in data processing and computer
service production with implications for
computer utility
AD-710011 05-M4
Analysis of experience data relative to computer
application programs for developing resource
estimating procedures
AD-711117 05-M4
Cost information reporting on magnetic tape for
data processing of contractor expenditures

- AD-713606 05-M2
- DECISION MAKING**
- Cost effectiveness analysis applicable to DOD military system selection and acquisition, using model to study airborne electronics subsystem A70-11673 05-M4
- Cost model based on initial and support costs for studying availability variations effect on system total cost and maintainability and reliability interrelationships A70-11674 05-M4
- Experienced and naive subject evaluation of probabilistic data, data source determination, and prediction of subsequent data in complex decision tasks A70-12379 05-M5
- Analytical scoring model design for effective evaluation of competing research and development projects A70-12634 05-M3
- Flights, best day pair and weekly leg schedules concept based on decision making model for traffic volume estimation in airline operations A70-12787 05-M4
- Incremental profit and total airline profit model programs for air cargo systems SAE PAPER 690413 A70-12899 05-M4
- Decision model for R and D project selection A70-12991 05-M3
- Decision analysis in R and D, discussing risk discounting and measure of value selection A70-13956 05-M3
- NASA Source Evaluation Board process for major contractor selection, discussing procurement practices and management techniques A70-13962 05-M2
- Managerial practices of problem identification, discussing research study in operating division of large corporation A70-14051 05-M4
- Weapon systems acquisition projects, studying procurement decision interactions ASME PAPER 69-WA/MGT-6 A70-14833 05-M4
- Computer display graphic technique for business decision making, noting electronic aids A70-16451 05-M4
- DOD systems acquisition management tools and policies, emphasizing role of development concept paper and outside personnel dialogue in DOD decision making A70-16460 05-M1
- Decision tree application to research project selection, cost stages, probable return on investment, and control devices A70-19001 05-M3
- Multidiscipline systems analysis of satellite assisted information system improving earth resource management, developing user decision models AIAA PAPER 70-335 A70-22855 05-M6
- Computer aided design programs as decision-making tool for fighter development project technical management AIAA PAPER 70-364 A70-23024 05-M4
- Technological forecasting for R and D planning including project selection and resource allocation decision making A70-23416 05-M4
- Models survey for evaluation and selection of research projects, discussing reasons for long range company A70-24070 05-M3
- Management systems growth in relation to computer applications development, noting second industrial revolution A70-24661 05-M7
- Computerized automation of R and D engineering, discussing critical effects of generalization and oversimplification A70-27006 05-M3
- Project cost estimate growth pressures on decision making by U.S. Air Force System Program Office director A70-30521 05-M1
- Probabilistic methods in aeronautical research and development A70-31393 05-M3
- Project authority relationship concerning manager authority and influence in five organization models A70-31571 05-M7
- Decision making role in management contribution towards success of research and development based on statistical decision theory A70-31573 05-M3
- Forecasting necessity and limitations in management decision making process A70-31574 05-M4
- Program risk analysis by aerospace industry pursuant to Federal Government procurement requirements A70-33427 05-M4
- Subjective probability estimation for R and D decision making, using analytical models incorporating risk and uncertainty A70-41175 05-M3
- Multidisciplinary studies in management and development programs in public sector - bibliographies NASA-CR-107457 N70-14798 05-M9
- Conditioning effects of technology on organizational behavior in planned social change AD-694995 N70-14997 05-M5
- Model of systems analysis study with governmental decision maker involved in planning and programming cost-benefit studies AD-695427 N70-15534 05-M4
- Accuracy of cost information for decision making - bibliographies NASA-CR-109181 N70-21107 05-M9
- Apollo project manager-contractor differences and similarities NASA-CR-109188 N70-21119 05-M8
- Importance and difficulties of doing interdisciplinary research at universities NASA-CR-109262 N70-21728 05-M3
- Apollo decision and lessons for policy-makers NASA-CR-109284 N70-23324 05-M7
- Technology assessment and effect on environment, society, and individuals - government research program N70-23793 05-M6
- Multidisciplinary research in management, technology dissemination, decision making, and government and university cooperation NASA-CR-109454 N70-24092 05-M7
- Factors that influence decisions concerning replacement and acquisition of equipment in aerospace industry N70-24989 05-M1
- Decision making process and diffusion of technological innovations AD-701001 N70-27867 05-M6
- Complementary capabilities of man and machine for planning and creative problem solving AD-704810 N70-34841 05-M7
- Use of advanced computer techniques by Bureau of Budget N70-35637 05-M4
- Operations research and factors affecting decision making for controlling operations JPRS-51140 N70-36102 05-M7
- Theory and implementation of cost and benefit analysis of transportation systems PB-190945 N70-36453 05-M4
- Coupling social problems into productive association with scientific research and development technology AD-704569 N70-36513 05-M7
- Information science as aid to decision making PB-189666 N70-37290 05-M4
- Measurement and development of management information systems AD-709412 N70-41599 05-M4
- Management analysis, discussing prediction analysis techniques, decision making, personnel development, and organizational problems AD-706105 N70-76486 05-M7
- Analysis of decisions under risk, discussing single-period inventory models AD-713050 N70-79085 05-M4
- Independent task scheduling algorithm, discussing logistics and decision making AD-711543 N70-79103 05-M4
- Prototype design for doctorate university program in policy sciences AD-697056 05-M7
- Organization and management problems of State Department in foreign affairs community AD-697373 05-M7
- Operational gaming in public systems and potential of systems research organization operations in nonmilitary public policy field AD-697712 05-M7
- Operations research and role of computer time-sharing technology as tool for decision making AD-698428 05-M4
- Validity of using self-ratings for selecting more accurate subgroups in Delphi procedures for eliciting group judgements AD-698735 05-M4
- National Administrative Research Agency design

- for connecting theoretical resources with practical aspects of social problem solving
AD-699334 05-M7
- Potential benefits from PPBS use in public higher education
AD-699557 05-M4
- Value of policy sciences in relation to operations research, systems analysis, strategy, and operational concepts
AD-700173 05-M7
- Industrial, data, and research management methods, organizational behavior and management systems analysis, and marketing
AD-703967 05-M7
- Information management and problem solving in computer systems under hardware and power failures, fire, and workload surge
AD-705341 05-M4
- Total system cost relationships to system design and cost parameters for management planning
AD-705983 05-M4
- PPBS, suboptimization, and decentralization in military management planning
AD-707097 05-M1
- Computer system design and analysis for management information systems
AD-708027 05-M1
- Operational procedures and data processing for management information systems
AD-708028 05-M1
- Decision model for production planning of governmental agency with multi-production facilities
AD-712827 05-M1
- Man/machine interface for 1990 management information system displays
AD-712998 05-M4
- Design requirements for real-time information and computational systems to assist R and D management in project selection decision making
AD-713244 05-M3
- DELPHI METHOD**
- Book on technological forecasting covering philosophical basis, Federal Government activity, R and D management, resource allocation, correlation and regression analysis, etc.
A70-11307 05-M6
- Computer applications to cost effectiveness and systems analysis for management planning
AD-703387 N70-74546 05-M4
- Validity of using self-ratings for selecting more accurate subgroups in Delphi procedures for eliciting group judgements
AD-698735 05-M4
- Ways to exploit political, economic, and military expert judgements on problems, in probabilistic forecast terms
AD-709906 05-M4
- Management models, operations research, and systems analysis applied to social and public problem solving
AD-710639 05-M7
- Comparison of Delphi method and group judgement estimates of information system programming time
AD-712052 05-M4
- E**
- ECONOMIC ANALYSIS**
- Computerized airline fleet planning methods for aircraft economics and airline operations
SAE PAPER 690415 A70-12898 05-M4
- Decision analysis in R and D, discussing risk discounting and measure of value selection
A70-13956 05-M3
- Earth resources data exploitation, describing potential organizational structures for data handling and various political, economic, and technological problems
AIAA PAPER 70-344 A70-22859 05-M6
- Project economic evaluation, discussing value analysis from market research recommendations
A70-38620 05-M4
- Federal and state fiscal management in post Vietnam phase
N70-16936 05-M8
- Scientific research and development effort of US including technology utilization, brief history, financial and manpower considerations, and predictions
AD-704364 N70-31351 05-M3
- Theory and implementation of cost and benefit analysis of transportation systems
PB-190945 N70-36453 05-M4
- Federal support for research and development in United States
NSF-70-28 N70-37109 05-M8
- Economic impact analysis of possible Kennedy Space Center phase down, discussing recent area growth and future projections
NASA-TM-X-65292 N70-75906 05-M8
- US defense industry inter-regional subcontracting network analysis
AD-709240 N70-77726 05-M8
- Industrial breakdown of NASA expenditures for goods and services in support of space program
NASA-CR-111548 N70-79010 05-M8
- Cost and performance estimate analysis of 21 military acquisition programs discussing causes for program growth
AD-698732 05-M8
- Approximation of constant industry wage structure and level cross areas used in predicting income distribution across states
AD-699922 05-M8
- ECONOMICS**
- International cooperation in military aviation emphasizing cost effectiveness in R and D, production and export prospects
A70-30939 05-M7
- British Government technological partnership with domestic industry and other countries
A70-41892 05-M6
- Federal funds for research, development, and other scientific activities, fiscal years 1968, 1969, and 1970
NSF-69-31 N70-20857 05-M8
- Economic planning and utility of scientific research and development
AD-701031 N70-26963 05-M3
- Management and control systems in sociology
JPRS-51005 N70-34777 05-M7
- Compilation of annotated references to literature on subject of management
NASA-SP-7500/04/ N70-40838 05-M9
- Research and development applications and distribution of effort discussing economics
AD-700756 N70-74111 05-M3
- R and D organization in developing countries, discussing policy and planning techniques, international relations manpower and training, and information requirements
NASA-CR-113542 N70-76364 05-M3
- Impact of government expenditures and technology utilization on American economy and urban planning
N70-76470 05-M6
- Role of management in international economic cooperation by information exchange
AD-697676 05-M7
- Data summary on realized profits of major defense contractors for 1968
AD-703303 05-M8
- Defense firm systems capabilities and civil market evaluation for defense firm resources
AD-706765 05-M6
- Technology utilization and economic development in developing countries aided by communications satellites
AD-707642 05-M6
- Economies of scale in data processing and computer service production with implications for computer utility
AD-710011 05-M4
- Industry classification system and analysis of military contract concentration in industries
AD-710589 05-M2
- ENGINEERING MANAGEMENT**
- Process specifications to control manufacturing operations, describing contents, purposes and preparation, emphasizing three levels of control
A70-17601 05-M1
- Computerized industrial plant facilities design
AD-700119 N70-25916 05-M4
- Project data file for total integrated engineering system
PB-190954 N70-34681 05-M4
- Computer applications to interactive and project oriented design in building industry
AD-708400 05-M1

EVALUATION TECHNIQUES

- Computer program for automatically selecting redundant parts and redundancy types for various aerospace systems characteristics A70-10488 05-M4
- Cost effectiveness analysis applicable to DOD military system selection and acquisition, using model to study airborne electronics subsystem A70-11673 05-M4
- Cost model based on initial and support costs for studying availability variations effect on system total cost and maintainability and reliability interrelationships A70-11674 05-M4
- Experienced and naive subject evaluation of probabilistic data, data source determination, and prediction of subsequent data in complex decision tasks A70-12379 05-M5
- Incremental profit and total airline profit model programs for air cargo systems SAE PAPER 690413 A70-12899 05-M4
- Decision model for R and D project selection A70-12991 05-M3
- Decision analysis in R and D, discussing risk discounting and measure of value selection A70-13956 05-M3
- Managerial practices of problem identification, discussing research study in operating division of large corporation A70-14051 05-M4
- Computer display graphic technique for business decision making, noting electronic aids A70-16451 05-M4
- Cost/schedule planning and control system /C/SPCS/ providing early exposure of inadequacies in work execution and initial planning A70-16461 05-M4
- Integrated USAF acquisition management systems approach engaging top management abilities available in government and industry A70-16463 05-M1
- R and D laboratory quality and performance evaluation techniques, describing Apstein-modified Pelz technique A70-17603 05-M3
- Decision tree application to research project selection, cost stages, probable return on investment, and control devices A70-19001 05-M3
- R and D resource allocation model based on correlated Navy technological forecast /WTF/ and exploratory development goals /EDG/ A70-23412 05-M4
- Technological forecasting for management planning, discussing structuring, prediction techniques, personnel selection, quantification, etc. A70-23413 05-M4
- Technological forecasting for R and D planning including project selection and resource allocation decision making A70-23416 05-M4
- Technology or research quantitative utility evaluation /TORQUE/ system genesis and operation, with implications affecting R and D A70-23418 05-M4
- Models survey for evaluation and selection of research projects, discussing reasons for long range company A70-24070 05-M3
- Avionics technology cost effectiveness effect on airlines and industry, considering systems engineering and specifications SAE PAPER 700299 A70-27447 05-M4
- Management science concepts tested for feasibility in large organization top management positions using questionnaire technique A70-28825 05-M7
- Price estimate elements interrelationship using three dimensional matrix for computerized cost data extraction A70-30524 05-M1
- Quality control role in configuration management, considering quality assurance organization of aircraft manufacturer A70-31104 05-M4
- Probabilistic methods in aeronautical research and development A70-31393 05-M3
- Decision making role in management contribution towards success of research and development based on statistical decision theory A70-31573 05-M3
- Forecasting necessity and limitations in management decision making process A70-31574 05-M4
- Program risk analysis by aerospace industry pursuant to Federal Government procurement requirements A70-33427 05-M4
- Technological forecasting as management concept in decision making process A70-34679 05-M6
- Systems analysis approach to problem solving, discussing application to sociological and educational considerations A70-35297 05-M4
- Systems engineering approach to comparison by emphasis for employee performance evaluation A70-35298 05-M5
- Management information systems based on Apollo program experience, considering improvements in data accuracy, display, feedback, etc. A70-37862 05-M7
- Cost effectiveness methodology for space program, industry, military sector, etc A70-38402 05-M4
- Value engineering for British aerospace industry management planning A70-38619 05-M4
- Project economic evaluation, discussing value analysis from market research recommendations A70-38620 05-M4
- Configuration management by critical element objectives, correlating various engineering functions in production processes SAE PAPER 868 A70-40352 05-M4
- Weight/cost systems engineering, discussing techniques for using historical data banks and standardized reporting procedures SAE PAPER 866 A70-40368 05-M4
- Aircraft manufacturing cost estimation in conceptual design phase, using structural synthesis program for cost buildup simulation SAE PAPER 865 A70-40371 05-M7
- Predictive model for potential variance from planned schedule of R and D tasks to minimize risk in management A70-41172 05-M3
- R and D program engineering talent assignment case histories A70-41174 05-M5
- Subjective probability estimation for R and D decision making, using analytical models incorporating risk and uncertainty A70-41175 05-M3
- Value of formal methods for evaluation and selection of research projects PB-186165 N70-13005 05-M3
- Graphical evaluation and review technique /GERT/ for analyzing manufacturing processes NASA-CR-86289 N70-14290 05-M4
- Research and development project planning described and analyzed by GERT NASA-CR-86278 N70-14409 05-M4
- Multidisciplinary studies in management and development programs in public sector - bibliographies NASA-CR-107457 N70-14798 05-M9
- Graphical evaluation and review technique for research and development planning process NASA-CR-86279 N70-15495 05-M4
- Quantitative techniques for research program planning in structural mechanics AD-696974 N70-17175 05-M4
- Research and development in defense programs AD-697343 N70-18659 05-M3
- System effectiveness model for command and control information processing systems N70-19989 05-M4
- Forecasting systems considered as instruments for development of optimal strategy in growth of science and technology and their effect on national economy JPRS-49730 N70-20159 05-M4
- Technology assessment and effect on environment, society, and individuals - government research program N70-23793 05-M6
- Computerized industrial plant facilities design AD-700119 N70-25916 05-M4
- Technology assessment by information management and systematic decision making as Congressional part of national resource allocation NASA-CR-109547 N70-26454 05-M6
- Organizational accounting system for government laboratories NASA-CR-110760 N70-32678 05-M3
- Management development of scientists and engineers in Federal Government, and analysis of behavior and systems NASA-CR-109820 N70-32877 05-M5
- Mathematical model for optimal assignment of scientific and engineering personnel in Armed

- Forces
NASA-CR-109823 N70-32879 05-M5
Personnel performance evaluation as employee job
motivation in government R and D activities
NASA-CR-109824 N70-32880 05-M5
Theory and implementation of cost and benefit
analysis of transportation systems
PB-190945 N70-36453 05-M4
Congressional recommendations for technology
assessment system for executive branch of
government N70-38647 05-M6
Learning-curve tables of 55 to 69 percent slopes
AD-708713 N70-40726 05-M4
Learning-curve tables of 70 to 85 percent slopes
AD-708714 N70-40727 05-M4
Developing manpower requirements in nonstandard
environments with random workload demands
N70-41006 05-M5
Measurement and development of management
information systems
AD-709412 N70-41599 05-M4
Learning curve tables of 86 to 99 percent slopes
AD-709178 N70-41936 05-M4
Distribution pattern analysis of aerospace
research projects for evaluating management
performance
AD-709867 N70-42966 05-M4
Computer applications in forecasting demands for
inventory management
AD-698831 N70-72538 05-M4
Evaluation of corrective maintenance burden
prediction procedure, discussing usefulness to
applied systems research
AD-704857 N70-75691 05-M5
System development, discussing system management,
planning, analysis, effectiveness, and
evaluation techniques
TN-0006-0 N70-78132 05-M1
Technique for improving labor estimates for
multimodel program using improvement curves
AD-712381 N70-78872 05-M4
Time and cost analysis technique for information
systems
PB-188946 N70-78895 05-M4
Thematic evaluation techniques for management
potential
AD-434732 05-M5
Cost reducing ideas for data, manpower, and
logistics management
AD-697990 05-M4
Characteristics of program budgeting and its use
in planning higher education
AD-698143 05-M4
Goal programming model to develop net manpower
requirements taking into account salary and
budget data
AD-698273 05-M5
Operations research and role of computer
time-sharing technology as tool for decision
making
AD-698428 05-M4
Cost and performance estimate analysis of 21
military acquisition programs discussing causes
for program growth
AD-698732 05-M8
Validity of using self-ratings for selecting more
accurate subgroups in Delphi procedures for
eliciting group judgements
AD-698735 05-M4
Quantity versus quality of data used in derivation
of cost estimating relationships
AD-699131 05-M4
Objectives, characteristics, and methods of life
cycle costing in system acquisition
AD-699191 05-M4
National Administrative Research Agency design
for connecting theoretical resources with
practical aspects of social problem solving
AD-699334 05-M7
Approximation of constant industry wage structure
and level cross areas used in predicting income
distribution across states
AD-699922 05-M8
Value of policy sciences in relation to operations
research, systems analysis, strategy, and
operational concepts
AD-700173 05-M7
Project ABLE methodology applied to aircraft
engine development and procurement
AD-700986 05-M4
Comparison of systems analysis and clinical
approaches to policy making
AD-701045 05-M7
Stockout cost as function of number of customer
requests backordered
AD-701172 05-M4
Determination of minimal cost combination of end
products and repair service capability
investment
AD-702450 05-M4
Expression derivation for expected repair project
completion time and repair time probability
distributions
AD-702451 05-M4
Calculating significant measures of supply
effectiveness for resupply of spares
AD-702452 05-M4
Consideration of inventories as factors of
production and formulation of inventory model
within firm theory
AD-702454 05-M4
Analysis of follow-up data from hiring company
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Modification of conventional accounting theory for
compatibility with computer technology and
information systems
AD-703898 05-M4
Time series analysis applied to market research
AD-704728 05-M4
Cost effectiveness analysis and resource
allocation for educational program planning
AD-704778 05-M4
Computer managed instruction system design,
development, and implementation
AD-704912 05-M4
Cost analysis and research evaluation of computer
applications and computer network design
AD-705149 05-M3
Method for estimating expected repair part usage
with no usage history
AD-705511 05-M4
Housing program evaluation technique for
consumers including resource allocation and
cost benefit analysis
AD-705883 05-M6
Total system cost relationships to system design
and cost parameters for management planning
AD-705983 05-M4
Man/environment interaction model for living
quality supported by surrounding environment
AD-706043 05-M6
Comparison of forecasting and prediction analysis
techniques for logistics management planning
AD-706088 05-M4
Computer program and management models for
time-sharing inventory analysis
AD-707096 05-M4
Computer-based system design to improve workload
forecasts for naval air rework facility and
comparison of forecasts with performance
AD-707725 05-M4
Project ABLE methodology applied to systems
developed through parallel prototypes
AD-707851 05-M4
Measurement technique comparing relative
importance of economic and non-economic factors
in job situations for personnel retention,
motivation, and job satisfaction
AD-708456 05-M5
Evaluation of time-span technique for measuring
work level in organizational hierarchies
AD-708767 05-M5
Economies of scale in data processing and computer
service production with implications for
computer utility
AD-710011 05-M4
Personnel recommendation form developed to aid in
scientific and technical personnel selection
AD-710684 05-M4
Application of systems analysis to mix of regional
transportation modes
AD-711035 05-M6
Measurement of training outcomes for evaluating
training techniques
AD-711302 05-M5
Quantitative measurement of production
technology

AD-711311 05-M7
Computer simulation models for urban planning
and problem solving
AD-711734 05-M6
Systems evaluation techniques applied to Civil
Defense operational planning, organization, and
training
AD-712314 05-M6
Statistical cost estimating relationships review
and analysis with improvement methods
AD-712463 05-M4
Empathy, projection, and negation attitudes of
managers from seven countries
AD-712480 05-M5
Review of cross-national managerial attitudes and
behavior
AD-712481 05-M5

F

FEDERAL BUDGETING

Federal and state fiscal management in post
Vietnam phase N70-16936 05-M8
National patterns of R and D resource funds and
manpower in US for 1953 to 1970
NSF-69-30 N70-71640 05-M3
Capital investment model as management tool for
manpower and equipment requirements in Navy
budget planning
AD-701302 05-M4
DOD budgetary process study with emphasis on
PPBS and resource allocation
AD-708424 05-M8
Program budgeting as aid to government management
of social, economic, and environmental systems
AD-711903 05-M8

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Organizational accounting system for government
laboratories
NASA-CR-110760 A70-32678 05-M3
Data summary on realized profits of major defense
contractors for 1968
AD-703303 05-M8
Modification of conventional accounting theory for
compatibility with computer technology and
information systems
AD-703898 05-M4
Information, financial, personnel, and systems
management methods
AD-703966 05-M7

FORECASTING

Systems engineering applied to airborne, airport
and community socioeconomic structure in
determining air freight and passenger demand
impact on airport location and configuration
AIAA PAPER 69-1091 A70-10605 05-M1
Book on technological forecasting covering
philosophical basis, Federal Government
activity, R and D management, resource
allocation, correlation and regression analysis,
etc. A70-11307 05-M6
Flights, best day pair and weekly leg schedules
concept based on decision making model for
traffic volume estimation in airline operations
A70-12787 05-M4
Computerized airline fleet planning methods for
aircraft economics and airline operations
SAE PAPER 690415 A70-12898 05-M4
R and D resource allocation model based on
correlated Navy technological forecast /WTF/ and
exploratory development goals /EDG/
A70-23412 05-M4
Technological forecasting for management planning,
discussing structuring, prediction techniques,
personnel selection, quantification, etc.
A70-23413 05-M4
Long range Army budget forecasting model based on
research project cost distributions and
parameters, describing computer program
A70-23415 05-M4
Technological forecasting for R and D planning
including project selection and resource
allocation decision making A70-23416 05-M4
Aircraft manufacturing market research including
cost compatibility with resources and capabilities
A70-30937 05-M8
Forecasting necessity and limitations in
management decision making process
A70-31574 05-M4

Technological forecasting as management concept
in decision making process A70-34679 05-M6
Forecasting systems considered as instruments for
development of optimal strategy in growth of
science and technology and their effect on
national economy
JPRS-49730 N70-20159 05-M4
Computer applications in forecasting demands for
inventory management
AD-698831 N70-72538 05-M4
Research and development applications and
distribution of effort discussing economics
AD-700756 N70-74111 05-M3
Use of schedule and cost information in evaluating
and controlling contractor performance,
discussing PERT and cost correlation technique
NASA-TM-X-65105 N70-75774 05-M4
Guidelines and computer system requirements for
PERT and cost correlation technique
NASA-TM-X-65247 N70-76126 05-M4
Improvement curves based on cost analysis,
forecasting, and procurement
N70-76669 05-M4

Inventory models with dependent demand and
forecasting with repair applications
AD-702456 05-M4
Computer systems and applications for management
planning by simulation
AD-704862 05-M7
Comparison of forecasting and prediction analysis
techniques for logistics management planning
AD-706088 05-M4
Computer-based system design to improve workload
forecasts for naval air rework facility and
comparison of forecasts with performance
AD-707725 05-M4
Ways to exploit political, economic, and military
expert judgements on problems, in probabilistic
forecast terms
AD-709906 05-M4
Comparison of Delphi method and group judgement
estimates of information system programming time
AD-712052 05-M4

FUNCTIONAL MANAGEMENT

Systems engineering management process for
satisfying MIL-STD-499 requirements, detailing
functional analysis, tradeoffs, and resulting
design analysis data A70-16462 05-M1
Project authority relationship concerning manager
authority and influence in five organization
models A70-31571 05-M7
Manned space flight programs management,
discussing organizational aspects of projects
including Apollo, space shuttle, and space
station A70-44696 05-M1
Project management basic authority relationships,
discussing individual, staff, intermix,
aggregate, and NASA Apollo models
NASA-CR-110829 N70-77748 05-M7

G

GERT

Graphical evaluation and review technique
/GERT/ for analyzing manufacturing processes
NASA-CR-86289 N70-14290 05-M4
Research and development project planning
described and analyzed by GERT
NASA-CR-86278 N70-14409 05-M4
Graphical evaluation and review technique for
research and development planning process
NASA-CR-86279 N70-15495 05-M4

GOVERNMENT CONTRACTING

NASA Source Evaluation Board process for major
contractor selection, discussing procurement
practices and management techniques
A70-13962 05-M2
DOD procurement practices for advanced weapon
systems, discussing government errors in
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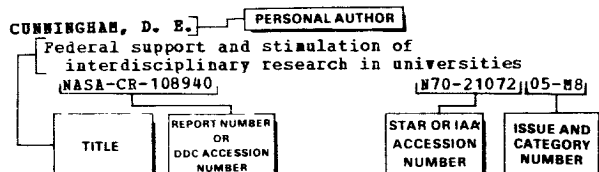
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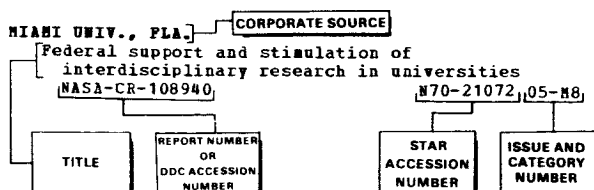
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